The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Fuel Research Progress

THE report just published by the Fuel Research Board is an admirable piece of work on the part of Dr. C. H. Lander, the Director of Fuel Research. Covering a very wide field, it reviews the whole of the operations since the institution of the Government organisation for fuel research in 1917, including a history of the organisation, a summary of the work carried out, and an account of the work in hand and projected. Among all these valuable records of research and experiment, perhaps the principal point that emerges is the steady advance in the attitude towards low temperature carbonisation. No final judgment has been arrived at even now, it is true; there is a large group of problems still under treatment, and a solution capable of national application is made the more difficult by the wide variety in local conditions. But, allowing for all this, the fact remains that high temperature experts and practitioners, who formerly could hardly be induced to look at the low temperature idea, now treat it seriously and are disposed to regard it as having a future. It seems, indeed, to be the line of future development.

Many scientific points have yet to be settled, but even when that has been done the ultimate determining factor will be the economic one. The substitution of low temperature coke for raw coal will not be popular for a long time with the private or commercial consumer, and if it has to be purchased at the same price it may be necessary to enforce its use by authority to ensure its general adoption. On the other hand, there would be the national gain in perceptible smoke abatement, and beyond this there would be the return from the various by-products. The three aims towards which we appear to be gradually moving are (1) the bringing into our fuel stock of all the coal the miner hews with the least loss and waste below ground, (2) the better scientific preparation of coal before it is put on the market, and (3) the extraction from it of its maximum effective use and value. Already the work of the scientist is beginning to count seriously in this matter, as the evidence of Dr. Lessing before the Coal Commission on Tuesday showed. There is abundant evidence of the range of that work in Dr. Lander's report, and the fullest justification for the further prosecution of the research schemes planned out. The Fuel Research Board has so far justified itself as to be now generally regarded as a national service of vital interest.

Visualisation in Plant Design

TOO much stress can scarcely be laid upon the necessity for obtaining precise and reliable information on which to base the design and arrangement of plant. It is, for instance, particularly exasperating to find when a plant is erected and started on its career that certain units are too small in capacity to keep the remainder of the plant at full load, or that the arrangement, while permitting of easy and convenient handling of raw materials and saleable products, does not permit of the cheap and ready disposal of some of the waste products or objectionable effluents. In the domain of chemical engineering we are still comparatively inexperienced, and although we have, in connection with many of the more common industrial processes, gone a good way towards thorough standardisation, there are quite a number of instances where standardisation does not work, and with which something more than technical knowledge is demanded of the designer. It is, probably, only when such cases arise that we are provided with an opportunity for determining the true worth of the designer, while consideration of the matter may, perhaps, go a good way towards providing an answer to the vexed question as to what really constitutes a chemical engineer.

We are tempted to reopen this long-standing argument after the perusal of a small but immensely suggestive volume which Dr. Geoffrey Weyman has lately contributed to the *Chemical Engineering Library* on the

"Design and Arrangement of Chemical Plant." The author's comments on the confused tangle of units so frequently to be found are far from being unjustified, and he shows no lack of courage in condemning the haphazard methods of the past and the lack of confidence which generally existed between plant maker and plant utiliser. Fortunately, a marked change is coming over our chemical works in this respect, a change which may most likely be traced to our recognition of the fact that there is a definite place to be filled by the chemical engineer, just as there is with the civil or mechanical engineering specialist. But, given the necessary chemical and engineering experience, there is yet another quality to be demanded which outstrips all others in importance and in its incidence upon the ultimate results. We refer to the quality of visualisation, the construction of a mental picture, and the ability to look ahead and imagine the circumstances which will surround a given plant and process when in operation. Design, certainly, is merely the exercise of forethought, but the designer too commonly pictures his plant in drawings and fails to visualise it in operation. In recent years the education and training of technical staffs have been so greatly improved that faulty procedure is becoming less and less common. It is, however, more than ever necessary to cultivate the habit of visualisation, and to train the mind on lines which shall ensure a correct appreciation of exactly what is going to take place. The great problem, however, is that of determining how such an ability is acquired. Experience over a number of years is, perhaps, the most infallible guide for the reason that one acquires something resembling an instinct for doing the right thing, and yet one learns from experience that this quality of "sensing" a situation is in many cases innate and never acquired. Dr. Weyman, however, shows in what directions the majority of the pit-falls lie, and in a particularly succinct and readable manner he brings his wide experience to bear upon the faculty of visualisation and the means whereby it may be acquired and applied.

Broadening the Chemical Outlook

Two notable utterances on chemical policy, coming from men in official positions in chemical science and industry, are reported this week. One is Dr. E. F. Armstrong's plea at the annual meeting of the B.A.C. for a wider and more tangible unity among chemists of all groups; the other is Mr. C. S. Garland's inaugural address on "Taking Stock" to the London Section of the Society of Chemical Industry. The former was plain and direct in its appeal; the latter was positively courageous in its frankness. Dr. Armstrong points to Germany and America as examples of what united action may achieve, and pleads that as the movement "from above" towards unity among British chemists has failed, it might now be renewed "from below." This contrast of altitudes, we are sure, had no reference to any geographical conception of the two states in which chemists may find themselves hereafter; that Dr. Armstrong could confidently leave to Dean Inge. It simply means that trees do not grow from the top downwards; they begin with roots in the soil, and grow upwards and outwards. So with any union or federation of societies. Beginning within the societies, the desire for union spreads until it pervades them all, and finally ends in an organic unity. This has always seemed to us the right way of going about the business, and it is satisfactory to find this view extending.

Mr. Garland's address, apparently deliberate and studied in its terms, was almost iconoclastic. Very much as Dr. Armstrong had done in Manchester in his summary of the qualities a chemist requires for executive posts, Mr. Garland emphasised the need, especially in relation to our scientific industries, of having technical men in positions of authority. Beyond this, he impressed on controllers of industry the folly of neglecting research, urged chemists to take a fuller part in the public work of their time, and pleaded for real co-operation in the conduct of industry through three-party councils representing employers, science, and labour. In relation to the Society of Chemical Industry itself, he reminded the London Section that the Society exists not merely to increase its own membership, but to assist industry. This sounds rather like something we have dared to say ourselves. A mere policy of self-preservation may end in losing the very life it seeks to save. On the other hand, an organisation which forgets itself and takes risks in its desire to get something done, is very rarely allowed to die for want either of members or of funds. This is very wholesome and encouraging doctrine, indeed, to come from the chair of the London Section.

America and Neutral Sulphate

The situation in America with regard to ammonia and its various compounds seems to be developing along lines very similar to those over here. The latest statistics indicate that production of synthetic ammonia in the United States is steadily increasing, but not yet to such an extent as to interfere appreciably with the market for the by-product variety. On the other hand, one finds indications of nervousness as to the future, and it is contended that before long the "point of saturation" must inevitably be reached, unless steps are taken forthwith to convert part of the ammonia to nitric acid or other ammonium compounds such as sal ammoniac. There can be no question that until recently the market for ammonia products has been dominated in all countries by the by-product producers, but with synthetic products coming into the field in ever-increasing quantity keen competition is in some instances making itself felt and prices have declined sharply. It has always been a difficult matter to obtain precise information as to the relative production costs of synthetic and by-product compounds of ammonia, and in this country, of course, the market position is undoubtedly assisted by the fact that all forms of sulphate of ammonia come under the ægis of the British Sulphate of Ammonia Federation. In America, however, it is openly stated that the costs of producing ammonium products have substantially decreased, a fact which, combined with the increased productive capacities of many plants, has presented a logical reason for a reduction in prices.

An interesting point which is probably not generally appreciated in this country is that a considerable

quantity of American sulphate of ammonia is slightly acid, the result being that the German neutral variety which has lately been imported there has found a ready market. This fact is not without its significance, and as the by-product producers must undoubtedly be the source of the acid material it would seem that it is high time they profited by the example set by our own manufacturers and took at least the first steps towards meeting synthetic competition by installing suitable neutralising plant.

Sulphuric Acid from Gypsum

A FEW weeks ago, at the general meeting of the Verein Deutscher Chemiker, reference was made to the gypsum-sulphuric acid process, as exploited at Leverkusen. This process, as our readers doubtless know, served an extremely useful purpose when supplies of pyrites were cut off from Germany during the war. The idea of the application of gypsum in the manufacture of sulphuric acid is not altogether novel, as reference to chemical literature will show. But the immense practical possibilities were only revealed by the Farbenfabriken vorm. Friedr. Bayer and Co. during the war. Essentially, the process consists in mixing gypsum or anhydrous calcium sulphate with suitable quantities of coal, coke, or anthracite duff, and treating the mixture in revolving furnaces. The sulphur dioxide evolved constitutes the basic product for the manufacture of sulphuric acid. The residue resulting from the calcination is in the nature of an ash or clinker, which is capable of yielding a satisfactory quality of Portland cement. Temperature control and the quantity of carbon employed in the original mixture are important considerations affecting success.

At present we are not so much concerned with the technique of this process as with the reasons which, in our view, have led to its discontinuance. What appears to have been overlooked by chemical manufacturers in this country is that there are two phases of the synthetic ammonium sulphate process, as worked in the United Kingdom. One is the ammonia phase, to which repeated attention has been directed in these columns. This is a success of the first importance, which cannot be over-emphasised. The other phase is the sulphate-radicle one, as we prefer to call it, involving the use of anhydrous calcium sulphate in lieu of sulphuric acid. We have hitherto made allusion to this aspect, but its significance does not appear to have been adequately appreciated.

The Economics of the Process

A FEW figures bearing on the economics of the use of anhydrous calcium sulphate or gypsum may be more impressive than pages of written matter. According to the fourth annual report of the Secretary for Mines, for the year ended December 31, 1924, the quantity of gypsum raised in this country in that year was 371,289 tons, as compared with 317,676 tons in 1923 and 257,460 tons in 1922. The average net selling value per ton at the mines was 10s. 1d. per ton in 1924, 13s. 2d. per ton in 1923 and 19s. 8d. per ton in 1922. Does the substitution of gypsum for sulphuric acid partially explain the progressive increase in the quantity of gypsum? Apart from this aspect, which arises out of a consideration of the figures in question, it must be remembered that one ton of gypsum contains 10·25 cwt. of sulphate-radicle, and one ton of anhydrous calcium sulphate, which we believe is found at the surface of the gypsum strata, contains 14·10 cwt. of sulphate-radicle. In 80 per cent. sulphuric acid, which is now selling at approximately 70s. per ton, there are 15·66 cwt. of sulphate-radicle, representing 4s. 5½d. per cwt. of sulphate-radicle, as contrasted with gypsum (taking 10s. 1d. per ton as the mine price), of 1s. per cwt. of sulphate-radicle, or anhydrous calcium sulphate (taking 10s. 1d. per ton as the mine price), of 8½d. per cwt. of sulphate-radicle.

These figures suggest that coal carbonising undertakings operating fairly large sulphate of ammonia plants could with advantage give consideration to the use of gypsum or anhydrous calcium sulphate in the manufacture of ammonium sulphate, in lieu of sulphuric acid. It is because this product has proved so economical in use in Germany, for the manufacture of ammonium sulphate from synthetic ammonia, that the gypsum-sulphuric acid process has fallen into desuetude. Why manufacturers of synthetic ammonium sulphate, both here and on the continent, should alone employ such an obviously cheap raw material from the point of view of the sulphate-radicle, is a question which, in our view, should be investigated by gasworks and coke ovens which manufacture sulphate of ammonia on a fairly large scale.

The Calendar

Nov. 10	Institution of Petroleum Technologists: "The Principles of the High Vacuum Distillation of Mineral Oils." Dr. Leo. Steinschneider. "The Determination of Unsaturateds in Petroleum Spirit" and "The Determination of Molecular Weight of Petrol." Dr. W. R. Ormandy and E. C. Craven. 5.30 p.m.	John St., Adel . . , London.
12	Institution of Chemical Engineers: Discussion on "Scientific Research Workers and Industry." Opened by the Hon. H. Fletcher Moulton. 8 p.m.	Hall of the Institution of Mechanical Engineers, Storey's Gate, London.
12	Oil and Colour Chemists' Association: "Chevreul: the Chemist, the Philosopher, the Man." Dr. E. W. Tripp. "Exposure Tests on Waterline Paints." E. F. Figg.	8, St. Martin's Place, Trafalgar Square, London.
12	Institute of Chemistry and Society of Chemical Industry (Bristol and S.W. Section): "The Rôle of Phosphorus in Agriculture." Dr. E. Vanstone. 7.30 p.m.	Chemical Dept., Bristol University.
12	Institute of Chemistry (Liverpool Section): Annual General Meeting.	St. George's Restaurant, Redcross St., Liverpool.
12	Institute of Metals (London Section): "Science and Industry." Dr. S. Hutton and Dr. O. F. Hudson. 7.30 p.m.	Royal School of Mines, London.
13	British Chemistry Dinner: Arranged by Chemical Industry Club and other chemical societies. Reception 6.45 p.m. Dinner 7.15 p.m.	Connaught Rooms, Great Queen St., London.
14	Institute of Chemistry and Society of Chemical Industry (Bristol and S.W. Section): Tour of Exeter and meeting: "The Measurement of over Voltage." Dr. S. Glasstone. 7.30 p.m.	University College, Exeter.

British Progress in Fuel Research Problems

Review of the Results Attained

The report of the Fuel Research Board for the period ended December 31, 1924, with the report of the Director of Fuel Research (Dr. Lander), published by H.M. Stationery Office, 1s. 6d. net, brings the record of research work in this country up to date. The following extracts, from a volume of 78 pages, give some idea of the conclusions so far reached.

By far the most important fuel produced in this country is coal, and on its efficient utilisation depends very largely the prosperity of all our industries. Some 250 million tons of coal are raised annually in Great Britain. Of these about 140 million tons are burned in the raw state, including 30 to 40 million tons used for domestic purposes, 60 to 70 million tons under boilers, and the remainder for furnace heating and for similar purposes. The gas industry uses some 18 million tons, and the metallurgical coke industry some 15 to 20 million tons, according to the state of iron and steel production. Some 20 million tons are used by steamships, and the balance is exported. The imports of liquid fuel in 1924 were (in millions of gallons): Lamp oil, 125; motor spirit, 422; gas and fuel oil, 452; and crude oil, 465, the figures for motor spirit and crude oil showing a considerable increase over previous years. Of the heavy oils, 252 million gallons were used by ships of the mercantile marine, and some 150 million gallons of petroleum oils were re-exported, about two-thirds of this after refining in this country.

Liquid and Smokeless Solid Fuels

Among facts such as these that first called for the Board's attention were the nature and amount of imported liquid fuels. To be dependent on overseas supplies of what had become war munitions of the first importance was a grave military weakness. The imports of liquid fuel had, moreover, become a serious financial burden, which was the more considerable because there was, as there still is, every prospect of a still greater consumption of such fuels as the use of motor traction and motor vessels approached more nearly to what would be economically advantageous. Motor spirit and fuel oil can, however, be obtained from coal, and what appeared to be one of the most likely processes produced also a large solid residue of smokeless fuel, readily burned in domestic grates, which would go far to solve the problems of smoke abatement if it could be used successfully and economically for domestic purposes.

With the object, therefore, of providing both liquid fuels and smokeless solid fuel, the Board initiated a number of investigations, which are still being pursued, into the carbonisation of coal at temperatures suitable to those purposes. These temperatures, known in this connection as "low" temperatures, are about 600° C., instead of about 1,200° C., as used generally in the present gas and other coal carbonisation industries. Low temperature carbonisation gives a much increased yield of tar, with an alteration of its character that is advantageous for certain uses; and though, as compared with what is obtained by high temperature processes, the yield of gas is relatively small, it may have a high calorific value and serve as a convenient and economical means of enriching high temperature gas.

The carbonisation of coal at low temperatures was by no means new; but although several industrial attempts had been made and were still in progress with the primary object of obtaining solid smokeless fuel, the considerable complexity of the problem did not seem to have been realised. Plants had been designed for making the fuel while many fundamental facts of the process were still unknown, and it seemed clear to the Board that, before a successful result could be expected, the fundamental circumstances of low temperature carbonisation must be studied on a technical scale as well as in the laboratory with a greater deliberation and accuracy than had been attempted previously. The work of the Fuel Research Station has done much to ascertain the processes through which coals are carbonised and the real structure of coke, and the results of this part of the work may be of value in industries using high temperature carbonisation, such as the manufacture of metallurgical coke. Methods have been developed by which the results of laboratory examination can be made more significant, and a control has been established over carbonisation on a technical scale which for the first time approaches the order of accuracy required in a laboratory.

In addition to studying theory and methods the Board has made, erected, and tested certain typical designs of retorts, with such modifications as seemed desirable. By collating the experience thus obtained a simple continuous vertical retort has now been elaborated, which is working smoothly and producing tar and cokes at low temperatures, while the labour required to run the plant is reduced to an amount comparable with ordinary gasworks practice. Though this plant appears very hopeful, a concluded opinion cannot be formed on its industrial value until it has been working steadily for a long period, as only after considerable experience under steady working conditions will it be possible to estimate at all closely the cost of working and depreciation of plant.

Low Temperature Carbonisation

In a comprehensive report on low temperature carbonisation, published in 1922, the Board expressed the opinion that the available data were not then sufficient to decide whether it would be possible to establish on sound industrial lines a new industry based on the carbonisation of the tens of millions of tons of coal that were being burnt every year in the raw state. It appeared to them, however, that the knowledge and experience gained by patient work during the previous few years had brought the answer almost within reach and that there were some grounds for expecting the reply to be "a conditional 'yes,' the elements of uncertainty being mainly economic and social." It seemed clear also at that time that no one process would be likely to be best with all types of coals and for all purposes, and that a successful process would be likely to find a use for qualities of coal for which at present there is little demand. The work done since that date shows a definite advance, but even now the question formulated in the earlier report cannot be answered finally.

In particular, a distinction must be drawn between isolated plants in selected districts and an industry on the national scale, carbonising in all several tens of millions of tons of coal per annum. The isolated plants in selected districts may be able to obtain the raw coal at a cheap rate, owing to its being in a form for which there is little demand, and it may also be possible to dispose of the products at a comparatively high price. The low temperature tars have properties which make them of special value for certain purposes, and thus up to certain quantities may command a price in excess of that paid for crude imported oils. If, on the other hand, the industry deals with a large proportion of the coal now used for domestic purposes in the raw state, the price of the coal for carbonisation must necessarily rise to a figure approaching that of ordinary household coal. The demand for tar for the special purposes mentioned above will be satisfied long before the industry develops to the extent here contemplated, and the price obtainable would tend to fall to a figure mainly determined by the price of imported fuel oil and motor spirit, unless some as yet unknown valuable constituent is discovered in the tar. It will be seen, therefore, that a system will not necessarily be a commercial success on a national scale because it has proved a success in an isolated plant, even though this plant be of a large size.

A method has been elaborated by which sample consignments of individual coals can be examined for their behaviour during carbonisation with any desired percentages of steam in strictly comparable conditions, and the facility for making such examinations has been of service to both coal owners and users.

A recent investigation has shown the possibility of enriching gas made in vertical retorts by injecting oil and cracking it into permanent gas, in this way allowing the volume of gas to be increased in emergency by increased steaming without sacrificing its calorific value. The investigation is being continued with the object of simplifying the apparatus at present used.

We have recommended that a bench of horizontal gas retorts,

similar to those in general use in many gas works, should be erected at the Fuel Research Station with the twofold object of investigating the working of the retorts and of providing a plant in which the behaviour of individual coals can be tested, when such tests are required for the work of physical and chemical survey. This recommendation has been approved and arrangements are being made for the erection of the retorts.

Washing and Purifying

Arrangements are now being made to install at the Fuel Research Station plants for washing and purifying coal which will be representative of the different methods in use. This will aid a study of the principles underlying the different processes and thus, it is hoped, lead to improvement of the methods. It will also enable the staff to determine the most suitable treatment for any given coal, a problem which will continually arise as the survey of the coal seams proceeds. The impurities in the coal as raised from the pit have different origins, and they occur in various forms distributed throughout the coal in various ways. Hence a purification process may remove different impurities in varying proportions, with the result that not merely the quantity but the quality of the resultant ash may be altered. The composition of the resulting ash may be of considerable importance, and recent work indicates that this may exercise a subtle but profound influence on the decomposition of coal when heated; the formation of clinker in furnaces and the action on the refractory linings is also affected by the character of the ash. It may therefore happen that, apart from the extent to which it is economically possible, purification beyond a certain point would for some purposes be actually harmful.

The industries dealing with metals form a most important part of our national activities and are responsible for the use of large quantities of fuel. It has not been possible, until recently, to carry out investigations on this subject, but arrangements have now been made for some work to be carried out on the fundamentals underlying the subject. A cognate subject is that of furnace design in general, and here also the best method of attack is under consideration.

Power Alcohol

Alcohol forms a possible alternative fuel for use in internal combustion engines, and its production is being investigated from this point of view. The usual method of production is by the fermentation of vegetable materials rich in starch, but as these materials have a high value as foodstuffs there is little prospect of any large supply of alcohol being produced in this country from such sources. The possibilities are greater in some of the Dominions and Colonies. The production from cellulosic materials, or by synthesis, presents technical difficulties, and experimental work is proceeding.

The scientific staff has until recently been so fully occupied with the control of the large scale work in hand that it was able to carry out but little fundamental work. Much of this has been waiting, but the additions to the staff recently made, and the further additions approved which will be made when the extensions to the laboratory are completed, will enable more of this essential work to be undertaken.

Chemists' Relation to Industry and National Life

Mr. Garland's Critical and Constructive Suggestions

Mr. C. S. Garland, the chairman of the London Section of the Society of Chemical Industry, chose the title of "Taking Stock" for his inaugural address on Monday, and indulged in some plain speaking to chemists as being responsible for the backward position in which industry in this country generally finds itself to-day. Mr. Garland admitted that he had made his remarks purposely provocative in order to draw expressions of opinions from others on some matters upon which he feels very strongly concerning the position of chemists and chemical industry.

Technical Men for High Posts

For instance, he said he regarded the appointment of Dr. E. F. Armstrong to the post of managing director of the British Dyestuffs Corporation as one of the most significant events of the past year, and he expressed the hope that the appointment of technical men to high administrative posts would spread not only through chemical industry but to industry generally. The present unfortunate position of British industry was largely due to the dictation of its policy by bankers and merchants rather than by manufacturers and scientifically trained men. At the same time, he looked forward to the time when the Government holding in the British Dyestuffs Corporation would be cancelled, because he did not believe that that undertaking would ever be made the full success it could be whilst there was any measure of Government control. The great need for chemical industry was amalgamation of the larger firms and a ruthless closing of redundant and inefficient works, leading possibly up to international agreements. This could not be done whilst the Government kept its holding in the British Dyestuffs Corporation, because no Government dare make such international agreements. Therefore, he made the definite suggestion that the Government should cancel its holding in the British Dyestuffs Corporation and at the same time take its share in securing the continuity of manufacture and of research.

It was also upon the question of research that Mr. Garland expressed himself strongly. He regretted the closing down of some of the research associations, and said that the relative failure of some others had been due to lack of imagination on the part of chemists and those responsible for the management of these organisations. There was much to be done in connection with standardisation, the study of basic costs, the economics of efficient production, and the conservation of raw materials, power, and fuel. Chemists must not leave these essential scientific researches to the accountant and the engineer. The recent German dye combine was mentioned as an instance of the competition which British industry has to face and much closer working arrangements between all sections of chemical industry was urged.

Chemists and Public Life

On the general question of chemists in national and local affairs, Mr. Garland was equally emphatic that the chemist has to blame only himself for the position in which he is. How many chemists were there who took any interest in national or local politics? Again, there was an increasing endeavour on the part of labour to share in the control of industry and already labour was largely represented on the Whitley Councils. Where were the chemists and the technically trained men in this scheme? Efforts should be made for three party councils consisting of the employers, the technical men, and so-called labour, so that the technical men would take their proper place in regard to the management of industry. An attempt was made to bring this about a short time ago, but it failed owing to the fact that there were differences of opinion among the chemists and they were unable to speak with one voice.

A Bigger Idea than Self-Preservation

Finally, there was a reference to what the Society of Chemical Industry ought to do to assist industry generally. At present, said Mr. Garland, the membership all over the world was less than 6,000 and yet he, in another connection, had a register of 50,000 manufacturers, most of whom ought to make use of chemists and chemical industry in some form. The spreading of the good work which the Society could do for industry should be undertaken, not so much with the idea of increasing the membership, but for the purpose of assisting industry, and he suggested that the accumulated funds of the Society should be used for this purpose. As a further means of bringing all sections of the industry together, Mr. Garland expressed the hope that it would be found possible, at the annual meeting of the Society in London next year, to inaugurate a yearly meeting of all the Societies connected with chemical industry.

Wembley and the Chemical Industry

By W. J. U. Woolcock, C.B.E.

We are glad to have from the chief organiser of the Chemical Section at Wembley the following discerning and instructive notes on the real meaning and results of the Exhibition which closed on Saturday.

THE closing of the Exhibition provides an opportunity for reviewing the effect upon the industry of six months of propaganda. The general impression in the minds of exhibitors in the Chemical Section is that the effort has been worth while. The nature of chemical industry precludes the possibility of making up a profit and loss account of the six months' trading, since, in fact, very few exhibitors kept products at Wembley for sale. Those who did so, however, have found that during the later months a fair amount of business has resulted, although, of course, the opportunities have been fewer than was the case last year.

An Opportunity for Propaganda

Exhibitors who looked upon this year's exhibition as an opportunity for propaganda are far from displeased with their effort. The fact that the crowds have been of smaller dimensions than last year has undoubtedly assisted those who wished to demonstrate the soundness of their manufacture, since the inquirer who had a real business object in visiting the Chemical Section has not been deterred this year from pursuing his inquiries by the presence of a wondering, but otherwise slightly interested, multitude. It has been quite usual, when visiting Wembley, to see the representative of an exhibitor engaged in earnest conversation with one or two business men who were obviously probing all the possibilities presented by the exhibit, and although it may be that no immediate result accrued by the booking there and then of a large order for British chemicals, the effect will undoubtedly be seen in the course of time. No better proof of this is needed than the bare statement that firms have found it worth while to retain at Wembley the services of important members of their staffs.

Latest Chemical Developments

The exhibition has provided an opportunity for demonstrating some of the latest developments of British chemical industry. Particular interest has been evoked in the display by British Cyanides, Ltd., of a new synthetic resin, which is capable of utilisation in a variety of ways, for the production of unbreakable domestic hollow-ware, for tiling and so forth. The same firm have been demonstrating the uses of silica gel, and their model plant for the dehydration of blast furnace air has evoked a great deal of interest in the iron and steel world, as providing a means for economy and greater standardisation in steel production.

The Graesser-Monsanto Chemical Works, Ltd., also have shown some of the uses to which condensation products can be put in industry, and their special brands of vanillin and saccharin have proved of exceptional interest.

Heavy and Fine Chemicals

The solidity and well-being of the British heavy chemical industry were aptly illustrated in the imposing space occupied by the Brunner Mond group of companies, but perhaps the most interesting features in their exhibit were the demonstration of the progress made by this country in synthetic ammonia production, and the flooring of the stand, which was carried out in a new type of oxy-chloride cement incorporating a proportion of ferrous chloride. It was interesting to note in the closing days of the Exhibition the publication by the Building Research Board of the results of their investigations into the corrosive effects of these cements upon iron and their statement that a cement incorporating a proportion of ferrous chloride provides the best solution.

The United Alkali Co., Ltd., and the Salt Union, Ltd., have worthily upheld the supremacy of the heavy chemical industry, and many visitors have commented with satisfaction upon the display by the former of the relation of early scientific discovery to the growth of their industry.

The effective display of "Izal" and the fine show of pharmaceutical products by Burroughs Wellcome and Co., have produced their effect in the fact that these names have become, if possible, even more in the nature of household words than heretofore. The same should be said of the Erasmic products, and the fact that the Soap Bubble was so frequently used as a place of *rendezvous* has served to impress and retain this firm's products in the public eye. Price's candles, Atkinson's and Bush's perfumery products, too, have improved their strong position in their prospective spheres.

Dyestuffs and Tar

The dominant feature of the exhibition, however, has been the co-operative display, first by the dyemakers and then by the tar industry. The striking beauty of the colour effects of the dyestuffs exhibit has been remarked upon not only by the King and Queen but by every one of their subjects who has passed through the arcades draped with the finest examples of the dyemaker's science and industry and the dyer's art. Few had realised that such effects could be produced, and fewer still, having been fed upon the legend of the supremacy of the German dyestuff, had realised that it could be done in Britain. A few sceptics in the early days had doubted the fastness of these dyestuffs. To them it may be replied that although no single draping or other material had been changed during the six months of the exhibition the exhibit looked as fresh and bright on the last day as on the first, despite the glaring sun of the early summer days. The dyestuff manufacturers are to be congratulated on their public spirit in thus demonstrating so much more conclusively than by bottles and dyed skeins, or even dyed materials, the splendid progress which they have made. The lesson has gone home to untold thousands of British men and women.

The refreshing country scene with its hospitable-looking inn (which displayed, however, flasks and other scientific instruments instead of the usual accompaniments of refreshment) has gone a long way to show the value of the tar industry to the road using community and to combat the fetish that imported products provide the best road-making materials. During the season large numbers of county surveyors and others interested in road construction visited this exhibit and thoroughly investigated the possibilities it portrayed. They were particularly interested to hear that during the course of the Exhibition the whole of the tar macadam was taken up one week-end and relaid, and although in the course of things no heavier roller than a heavy garden roller could be used, it was fit for light traffic by the Monday evening. It is, perhaps, not entirely a coincidence that the demand for road tar this summer has been phenomenal.

The Scientific Section

Finally, mention must be made of the Scientific Section, which this year was framed on much more popular lines. The relation of coal, salt, and food to chemical industry was admirably demonstrated by model and diagram. So simple was it that it needed no special demonstration, and yet that it was full of interest may be gathered from the fact that every day there might be seen the studious schoolmaster or parson making copious notes for his lecture or sermon and spending an hour or more in seeing these few square yards as thoroughly as might be. The lessons to be seen in the Chemical Section as a whole were followed through into the Scientific Section, and as the colours in the seven colour spectra illustrating "Colours from Coal" vied with the brightness of the dyestuff exhibit, so the liveliness of the fish and plant life, whose every drop of running water passed over tar, showed that a tarred road does not necessarily mean death to fish or to green life.

It was fitting that the entrances of this section should be guarded by the model laboratory of Baird and Tatlock (London), Ltd., and the admirable display of British scientific literature by Ernest Benn, Ltd.

The years to come, which are to be fruitful for British chemical industry, as indeed for all British industry, will assuredly see the justification of the propaganda which has been carried out at Wembley. At any rate, the millions who have seen Wembley have seen British chemical industry as the first example of her industry; they know a little of what is being done, and will not be entirely without interest in the further progress which they will see reported from time to time in their daily papers.

The Growing Movement towards Chemical Unity

Views at the B.A.C. Annual Meeting

THE eighth annual meeting of the British Association of Chemists took place at the Midland Hotel, Manchester, on Saturday, October 31. Dr. E. F. Armstrong presided.

Annual Report

The annual report of the Council stated that the membership was increasing satisfactorily, and was significant of the increased prestige which the Association now enjoyed. The financial statement showed a deficit which, however, need not be regarded with alarm, as during the year some generous contributions had been received. It was considered necessary to increase the annual subscription. The Unemployment Benefit Fund had now been in operation for three years, the total disbursements to date being £2,487, while £942 had been paid out in 1924-5 to 30 members. The circulation of weekly lists of "Situations Vacant" had been continued and the number of employers who approached the Association directly had tended to increase, while the facilities for advice offered by the Legal Aid Department were being freely utilised by the members. The problem of the legal redefinition and organisation of the profession was still under serious consideration. The relations of the Association with other societies were of the most cordial character, and there had been frequent consultations with the Institute of Chemistry and other societies in regard to matters of common interest to all technologists. The report also contained a reference to the death of Mr. A. Stewart Mills, first assistant secretary of the Association, on July 5, from tuberculosis.

New Officers

The following were elected to serve as officers of the Association for the ensuing year: President, Mr. C. S. Garland; Vice-Presidents, Mr. William E. Kay, Mr. F. Schofield, and Professor I. M. Heilbron; Honorary Registrar, Mr. David Bain; Honorary Editor; Mr. R. Brightman; Honorary Treasurer, Mr. W. H. Woodcock; Honorary General Secretary, Mr. H. T. F. Rhodes.

An alteration was made in regard to Rule XIIIA of the Unemployment Benefit Fund, by which it was provided that only full members holding full-time salaried appointments should be eligible for participation in the benefits of the scheme.

A vote of thanks was unanimously accorded the officers for their services during the year, and special reference was made to the appointment of Dr. E. F. Armstrong as managing director of the British Dyestuffs Corporation.

Dr. Armstrong's Appeal for Unity

Dr. E. F. Armstrong, in responding on behalf of the other officers and himself, said it was necessary for them to concentrate their efforts upon one particular goal, and preferably upon something which nobody else did—namely, the secure establishment of an Unemployment Benefit Fund. He believed that that fund was the main plank in their Association. The Institute of Chemistry, at its conference in York, apparently agreed with the Association that there must be a body established for the purpose of registering all chemists, and there were indications that some solution of this problem would be possible in the future. Registration was certainly a matter to which their attention should be directed. Personally, it had always been his ideal to assist, as far as lay in his power, in bringing the various chemical societies closer together. The American Chemical Society wielded enormous influence, because it spoke with one voice for all chemists and all chemical activities. It had a membership of 14,000, and the very best people of the country were proud to be associated with it and to work for it.

In Germany there were two societies—the chemical on one side and the industrial on the other, and there was one conference in the year when everyone met everybody. In this country one immediately noticed a very good example of what we lost by not all being connected with one society. Those who attended the Leeds conference of the Society of Chemical Industry knew what a splendid meeting it was, while those who went to the York conference of the Institute of Chemistry also knew how successful that was. He was quite sure that in the case of both conferences those who attended them realised what an enormous benefit could have been reaped by larger attendances. If those two conferences could have been held together, instead of separately, then the bio-chemists could have had a bio-chemical section, the engineers an engineering section, and so on. A conference could be held twice a year if thought desirable, and it would be worth the while of a firm to pay the expenses of their chemists to attend it. Everyone ought to continue working for the aim of one big society. American chemists visiting this country were always struck by the fact that their English confrères knew so little of one another. This was because the opportunities for meeting were so few. An American chemist appeared to have at least a nodding acquaintance with every other chemist. There were enormous possibilities for individual chemists to improve their positions through attendance at such united gatherings. Efforts from above to bring about co-operation between the various societies had, in the main, fallen to the ground because of the opposition of vested interests. He pleaded that the effort should be renewed from below.

Something more than a Chemist

In talking to a body of chemists it was with very great diffidence that he emphasised the importance of a man being something more than a chemist if he wished to climb the ladder of success in life. First of all, let him make himself a good chemist, able to tackle any problem in chemistry. Over and above that, he must be a man of tact, able to get on with his fellow workers, cultivate a good presence so that he could lead, because a diffident or shy man could not take charge of a large industrial organisation, and yet all the time he must look around him and indulge in self-analysis: "How can I improve myself? How can I fit myself for the battle?"—rather than become cynical and critical and regard the unsatisfactory position which he occupied as due to the evil neglect of those above him. The mere knowledge of chemistry, though difficult to acquire and difficult to explain to a layman, was not sufficient to enable a man to claim more than a limited share of the wealth of the world. It was the application of that knowledge which the world wanted, and for which it was willing to pay. Our universities were never better than they were to-day, and professors were never more able or more willing and anxious to impart knowledge. We were very proud of the volume of chemical work that was being done in this country. We needed to apply that knowledge to industrial life in order to make the chemical profession in this country as successful as it deserved to be, which, without in any way being pessimistic, at present it was not.

During the evening the members of the Association met at dinner at the Midland Hotel, Dr. E. F. Armstrong again presiding.

Chemists in Public Life

Mr. C. S. Garland, the newly-elected president, proposed the toast of the Association. He said that correspondence which had passed recently, in which the Institute of Chemistry stated that they welcomed co-operation with the Association, represented a definite turning point in the history of the latter. Referring to Dr. H. Levinstein's candidature in the municipal election for the Didsbury Ward at Manchester, Mr. Garland said he felt very stongly that chemists generally did not take sufficient interest in politics, and more particularly so in regard to local affairs. There were probably not more than a dozen chemists represented on the municipal institutions of the country, though one found a large number of engineers, doctors, solicitors, and tradesmen of all descriptions sitting as representatives of the ratepayers. Yet chemists were vitally concerned in the welfare of the country. They had to see that the people got pure food. Even the present day motor car was the product of the metallurgical chemist, who had given the engineer the necessary steels.

Mr. S. Reginald Price, in responding, said that the more the chemist took his place in public affairs of all sorts the more valuable he would become to the country as a whole.

Mr. E. R. Redgrove proposed the toast of "Kindred Societies," and Mr. L. Guy Radcliffe responded.

Fastness-to-Light in Dyeing

Progress in Celanese Methods

THE first meeting of the session of the Nottingham Section of the Society of Chemical Industry was held jointly with the Society of Dyers and Colourists on Wednesday, October 28, when Mr. G. H. Ellis, A.I.C., read a paper on "Fast-to-Light Dyeing of Celanese."

Mr. Ellis said that in the oldest times, whenever colouring arts were practised, stress was laid in recorded notes upon fastness considerations. The technique of dyeing was not understood, and methods of improving the fastness of colours were rather empirical. The introduction of artificial colouring matters, starting with the much quoted "Mauveine" of Perkin, was not always productive of fast results as compared with those obtained with madder, indigo, barks, logwood, and other natural colouring matters in wide use. There were, in fact, considerable inferior substitutions, some of which still persisted. One of the results was that the so-called "aniline" dyestuffs did not at first achieve and enjoy an entirely favourable reputation for fastness.

Now, however, the days of fugitive colours were numbered. Textile research had led to the production of fabrics in much improved quality and durability, and consonant with this there had grown an increasing demand for fastness in colourings. To-day there was an ever-growing call for colours which could survive or should at least equal in durability the fibres holding them. The production of dyestuffs capable of withstanding these tests had again raised the prestige of aniline or artificial dyestuffs, and there was now a large number capable of persisting against tests which few if any natural dyestuffs, applied according to the best known processes in the arts, could withstand.

Fast-to-Light Dyeing of Celanese

Mr. Ellis then went on to describe the evolution and present state of fast-to-light dyeing of Celanese. The most suitable colouring matters for Celanese, he said, were insoluble in water, and a method based on "the colloidal state" had to be devised. This reduction of the dyestuff into the colloidal state permitted the successful dyeing of Celanese. A special range of dyestuffs was built up, and it was found that in general these special colouring matters behaved reciprocally towards other fibres as cotton colours behaved towards Celanese, that is, they would not dye cotton, other artificial silks, or real silk, nor would they more than slightly stain wool. This rendered possible what was well known to all dyers, the production of contrasting colour effects on materials composed of Celanese together with other fibres such as cotton or silk.

Effect of Ultra-Violet Rays

The well-known basic dyestuffs which found some application for Celanese were very often loose to light, mostly loose to soaping, and almost without exception loose to alkalis, such as occur in washing preparations with inferior soaps. In formulating the range of S.R.A. colours, therefore, the fastness tests imposed from the beginning were very high. The first line of action was to attempt to improve the light-fastness of certain individual colours. There were many theories regarding the mechanism by which the action of light caused fading, etc., but the two most important were, first, the action of the ultra-violet rays present in the sunlight, and, secondly, auto-verdation, a chemical process which might be partly set up by the catalytic action of those rays, but which brought about loss or change of colour by a more or less definite reaction within the colour molecule; one portion acting as an oxidising agent, *e.g.*, the nitro group, another as a reducing agent, *e.g.*, the amino group.

It was found that Celanese which had been treated with amino bases such as alkyl anilines possessed the power of eliminating a large proportion of the ultra-violet rays. Untreated Celanese allowed ultra-violet light to pass very freely; thus cellulose acetate containing absorbed dimethylaniline removed practically all those rays, below about 3,400 a/u. Now it was found that if dyed Celanese was also treated with such organic bases, the best being dimethylaniline or diethylaniline, the action of these in absorbing those very active component rays led to a considerable improvement in light-fastness. Certain other colours were not improved, and it seemed characteristic that colours strong in nitro groups were rather deteriorated than assisted by this process. This, in the opinion of Mr. Ellis, was due primarily to auto-oxidation.

Dyes for Other Cellulosic Fibres

Mr. Ellis dealt with fast colours for other cellulosic fibres such as cotton, viscose, etc. The classes of dyestuffs for very fast work on these fibres are roughly four—(*a*) mordant colours; (*b*) fast direct colours; (*c*) insoluble azo colours; (*d*) vat colours. Many of these colours showed almost perfect resistance against Celanese, and therefore found wide use for dyeing mixed goods containing Celanese. For all round excellence, the best generic group of all was the vat dyestuffs, and in particular that branch of colours known as the anthraquinone series which embraced Indanthrene, Duranthrene, and Caledon. The application of direct cotton colours with S.R.A. colours on mixed fabrics had met with some success, but the desirability of applying vat colours was visualised, and here the difficulty was that the essential assistant for the vat colours was the use of caustic alkali in fairly high concentration, which brought about the decomposition of Celanese, regenerating hydrated cellulose which behaved similarly to viscose in dyeing. The curves of rates of hydrolysis at various concentrations showed that alkali salts such as the sodium or potassium salts of hydroxy bodies of the organic aromatic series, *i.e.*, salts of phenolic substances, achieved only very slow rates of hydrolysis, even at fairly high concentrations.

A series of tests had shown that the use of these alkali salts in the application of vat dyes was widely possible. Tests on vat colours had comprised two chief points, first the suitability of the dyestuffs for application by these alkali phenolic substances, and secondly the resist property of Celanese. In practice the process consisted in preparing the vat dyes in leuco condition and subsequently applying them by using alkali phenolic substances, *e.g.*, sodium phenate. If desired, the dyebath might be first prepared by employing free caustic alkali and then neutralising with the appropriate phenolic substance. It was not advisable to attempt single bath dyeing, as was done with S.R.A. colours and direct cotton colours.

The application of vat dyes with reduced alkalinity conditions might be considered for other fibres, which were liable to be attacked by free caustic alkali. So far, however, only the dyestuffs requiring very small amounts of caustic alkali had been substantially applied to such animal fibres as wool and silk, and then principally the Indigoid dyestuffs.

Chemical Firm's Voluntary Liquidation

A MEETING of the creditors of the Thames Bank Chemical Works, Ltd., 6 and 7, Charing Cross Chambers, Duke Street, London, was held on Friday, October 30. Mr. C. H. Whatley, liquidator and receiver for the debenture holders, presided.

The statement of affairs showed liabilities of £2,579 12s. 9d., of which £579 12s. 9d. was due to unsecured creditors, and there were loans on debentures amounting to £2,000. The total assets were £438 8s. 4d. and the net assets £370 11s. 1d., leaving an estimated deficiency, subject to the costs of liquidation, of £2,209 1s. 8d. The issued capital of the company amounted to £5,652, so that the deficiency as regards the shareholders was £7,861 1s. 8d. The company was registered in November, 1923, with a capital of £100, to manufacture cellulose acetate and similar substances used in artificial silk manufacture. The registered office, originally at Durham Wharf, was removed to Church Wharf, Chiswick, and later to Charing Cross Chambers. The first directors were Messrs. Kenneth S. Low (managing director for life at £2 a week), T. P. Morgan and A. F. Storer, and at various times there were elected to the board Messrs. A. Low, C. L. Harvey (who retired in 1924), Percy Cooper, L. Rosenvinge and Ernest Davies. Mr. Storer advanced to the company sums amounting to £450. In January, 1925, it was resolved to increase the capital to £6,000, and this was done. Later, Mr. K. S. Low agreed with the company to hand over certain processes in exchange for 2,600 fully paid shares. In June, a debenture of £2,000 at 6 per cent. was issued to Mr. J. L. McConnel. Efforts to raise further capital failed, and proceedings being threatened by certain creditors, on October 13 a resolution was passed that the company should go into liquidation.

Some surprise was expressed at the meeting that none of the directors was present, and a resolution was passed confirming the appointment of Mr. Whatley as liquidator.

Industrial Sampling in Gas Works

A Works Chemist's Notes on Methods

MR. J. H. GEE, B.Sc., senior works chemist at Central Laboratory of the Birmingham Gas Department, delivered his presidential address to the Midland Junior Gas Association, at Birmingham, on Thursday, October 29. Dealing with the question of sampling, he emphasised the need of care and gave the following examples :—

Sampling of Tar

For determination of the liquor content, he said, if the tar was not covered with an excessive quantity of separated liquor, a sectional tube sampler furnished with a valve *at the bottom* provided a representative sample. It was necessary to lower the tube into the liquid slowly, and as many positions as possible should be sampled. This method was useful for boats or tanks not more than 4-5 ft. in depth. For larger tanks probably the best method was to take a generous intermittent drip sample from the pipe line whilst the tank was being emptied or filled. A petcock opened full-bore to give, say, half a gallon sample for every 6 in. of a tank 150 gallons per inch could be taken as an indication of what was necessary. Slow running continuous drip samples were usually very inaccurate for mixtures of tar and liquor. As an alternative method, where the above was not feasible, the tar should be well agitated by compressed air or preferably by a mechanically driven paddle, and the sample quickly taken with a ladle. Prolonged use of compressed air might affect the proportion of volatile constituents in the sample. A close study of the system of tar and liquor separation on any works would probably be well worth while. It was becoming more and more evident that the tar should be separated from the liquor at the earliest possible moment, more particularly where steaming in verticals was carried on.

A paper read by Dr. T. Lewis Bailey, Chief Alkali Inspector, before the Institution of Chemical Engineers, last July, showed that colour-producing phenolic bodies of high oxygen absorption power were transferred from the tar to the liquor, when the two were allowed to remain in contact, and subsequently gave trouble when the effluent liquors from the ammonia stills had to be disposed of. Further, the prompt separation of tar and liquor while they were hot, naturally lessened the formation of those more or less permanent emulsions which were met with.

Cadmium Chloride for Sulphuretted Hydrogen

In this case a 10 per cent. solution, acidified with 5 per cent. hydrochloric acid, should be used. The absorption of H_2S should be made without violent agitation, and should not be prolonged beyond 1½ minutes, otherwise there was some risk of absorption of CO_2. If the results by cadmium were doubted, checks could be made by the iodine method or by absorption in sodium hypobromite followed by precipitation as $BaSO_4$. Another indirect method was to absorb both H_2S and CO_2 in strong potash, at the same time taking a sample of purified gas at outlet purifiers for CO_2 only. Then, assuming no change in the CO_2 content inside the purifiers, the difference represented the H_2S removed by the purifiers. Obviously, lime purification or the presence of excessive quantities of ammonia would upset this method. Mr. Gee said that he had used all four methods and had obtained good agreement on percentage of H_2S.

Pyrogallol for Oxygen

Here it should be remembered that alkaline pyro if too strong, or if stale, or not strongly alkaline, would give off CO.

Ammoniacal Cuprous Chloride

This was probably the best absorbent for carbon monoxide. The ammonia used should not be too strong or there would not be efficient absorption of CO. Even when two fresh pipettes of solution made up to correct strength were used, it was quite likely that a trace of CO would be unabsorbed. When using a mercury apparatus it should be remembered that the association of the CO and cuprous chloride was a loose one, and that CO was evolved from the mixture upon reduction of pressure.

Combustion by Copper Oxide

Three points must be watched in connection with this operation : (1) The tube should be kept at a sufficient temperature, 800° C. being necessary for complete oxidation. If too high a temperature was maintained, the silica tube might become porous. (2) The oxide must be revivified by passing air over it. If a considerable number of analyses were made, say, 5 to 10 per day, the revivification should be carried out daily as a routine operation. (3) Copper oxide gave off oxygen at 800° C. and this must be absorbed in pyro after the combustion. This oxygen might amount to 0·3 to 0·4 ccs. during a test. Although not necessarily a true criterion of the purifying activity of an oxide, the Fe_2O_3 content, in some form or other, was still usually the basis of price, combined, of course, with the moisture content.

Estimation of Fe_2O_3

Some analysts still weighed the whole ammonia precipitation as Fe_2O_3. With modern oxides this was not safe. Alumina, phosphoric acid, titanium oxide might be present, and would cause high results. The absorption of alumina by excess of potash was not reliable, and still left titanium and phosphoric acid in the precipitate. In the volumetric method the stannous chloride method was not accurate in the presence of titanium, and if SO_2 was used it was not easy to remove the last traces of the excess. The gravimetric method, taking sodium thiosulphate as the separating reagent was, perhaps, the safest. In this two precipitations with ammonia were made. No. 1 was ignited and weighed off in the ordinary way ; No. 2 was just redissolved with HCl, and sodium thiosulphate was carefully added, with shaking until the colour was nearly discharged, after which two or three grammes of $Na_2S_2O_3$ were added. After this the solution, etc., was boiled for about 20 minutes, when there was complete precipitation of the alumina, titanic oxide, and phosphoric acid, the iron remaining in solution. The precipitate was then washed with 1 to 2 per cent. of acetic acid until free from iron, and its weight after ignition subtracted from No. 1, the difference being Fe_2O_3. Taking the total ammonia precipitate as Fe_2O_3 might easily give a figure 10 per cent. higher than the truth in certain oxides.

Anglo-South American Trade

[*To the Editor of* THE CHEMICAL AGE.]

SIR, — You may be interested to hear that already, almost before the Prince had set foot on his own shores again, there is concrete evidence to show that his visit to the rich countries of South America has already had the effect of stimulating trade between these countries and Great Britain.

Judging from figures and information which have reached this Association both from British manufacturers and South American importers, we estimate that the next twelve months' returns will show an appreciable increase in trade from 15 per cent. to as much as 30 per cent. Already big contracts involving large sums have come to this country from both the Argentine and Chile ; whilst, stirred by the Prince's words of how we are losing trade, British merchants are actively setting to work and sending out their representatives.

It was, of course, physically impossible for the Prince to visit any of the northern Latin-American Republics, but in this connection the following is a striking gesture of the general feeling that animates these countries, as far as trading with Great Britain is concerned.

This Association has been informed that within the next few weeks a deputation of Venezuelan traders and business men is proposing to visit this country with the express purpose of " talking over a table " with our own manufacturers and business men, to show them that although the Prince was not able to visit Venezuela, this little republic which, for its size, has more British capital invested in it than any other of the 17 South American republics, is determined that industrial intercourse between Latin America and this country shall be developed to the utmost. As the Consul-General for Venezuela in London himself has said, " In spite of all the British capital that is invested in Venezuela, of all the thousands of ships that come to Maracaibo each year, less than 1 per cent.—to our regret—are British."

This is a state of things which, by means of the Prince's visit, together with what influence this Association may be able to exert, is going to be drastically amended. That, at any rate, is the fervent hope of all those who intend to see Britain reassert herself in the world's markets.—Yours, etc.,

S. HECKSTALL-SMITH,
Secretary.

Anglo-South American Association,
25, Haymarket, S.W.1.

Society of Glass Technology

Mr. T. C. Moorshead's Presidential Address

THE first meeting of the Society of Glass Technology for the Session 1925-26, was held in Sheffield on October 21, when Mr. T. C. Moorshead delivered his presidential address on "The Glass Bottle Industry and Its Future Developments."

Mr. Moorshead pointed out that the last quarter of a century had seen practically a complete revolution in the manufacture of glass containers. About 1900, two ideas, totally different in principle, suddenly appeared. One was Homer Brooke's idea of feeding a machine with a stream of glass flowing by gravity from the furnace. The other was the application of the suction principle in feeding the machine, a process developed by M. J. Owens. From that time progress in the development of mechanical devices for glass manufacture had been rapid. With the development of automatic processes there had come a very great improvement in the character of all of the auxiliary plant and equipment, with the result that to-day many bottle manufacturing plants were practically mechanically operated throughout. Future developments in the gravity process and in the suction process depended on different factors. The success of the suction process lay in its application to mass production, but it was not economically adaptable to the smaller units. With the gravity flow process it should be possible, on account of the comparatively simple auxiliary plant required for feeding, to produce articles more economically and at the same time to obtain the desired flexibility of operation.

Furnace Design

Dealing with furnace design Mr. Moorshead said that believing in the feasibility of the principle of feeding and melting the batch at the same time, the United Glass Bottle Manufacturers, Ltd., were arranging to finance some experimental work based on the principles outlined by Mr. Alex. Ferguson, and described to the Society of Glass Technology in May, 1923. The theoretical advantages claimed for the new process were smaller radiating surface per ton of furnace melting capacity, the ratio being approximately 2 to 1, and more intimate contact between the flame and the constituents of the batch. The first mentioned, however, depended upon the feasibility of melting the batch, when pulverised and fed into the furnace in fine powder, in the short time of passage through the flame; and upon the corrosive effects of the stream of melted glass on the side walls of the funnel-shaped melting chamber, as well as the effect on the glass itself.

In conclusion, he said the mechanical development of the bottle industry in the past 20 years had been little short of marvellous, and in mechanical efficiency was probably not surpassed by any other manufacturing industry. Nevertheless, still further research was necessary to discover a formula from which it would be possible to produce a glass with more stable characteristics than that with which they had to deal to-day. Further knowledge of the mechanical properties of glass would also assist in opening up new fields or markets which had heretofore been untouched, and considered outside of the domain of the glass manufacturer.

Colours of Flowers and Fruits

AT a meeting on Monday of the University of Birmingham Chemical Society a paper on "The Colours of Flowers and Fruits" was presented by Mr. W. R. Bucknall, B.Sc. The paper was devoted to one class only of flower colours—namely the anthocyanidin pigments. After a brief introduction, Mr. Bucknall gave an historical sketch of the subject, mentioning, in particular, the work of Berzelius, Griffiths, Molisch, Grafe, Willstatter and Everest. Then followed an account of the constitution of cyanidin chloride, based on its synthesis and decomposition products. The more important properties of cyanin- and cyanidin-chlorides were dealt with, and the author went on to give an account of the natural pigments, dividing them into three groups, based respectively on pelargonidin, cyanidin, and delphinidin. The tinctorial properties of the series were considered and the effect of the increase of OH and OMe groups demonstrated. The chief causes of colour variation in flowers were mentioned and some examples of the effect of varying conditions given. The paper concluded with a brief survey of the various hypotheses accounting for their photo-synthesis, and a few examples of the problems still unsolved.

A New Type of Fire Extinguisher

Chemical Powder Replaces Liquid

AT New Eltham on Monday the Total Fire Extinguisher Co., Ltd., of British Columbia House, 1–3, Regent Street, London, gave a demonstration of their productions. It was explained that the process was the subject of a German patent, but that the British Empire and American rights had been purchased, and that the apparatus was completely British made.

The extinguisher consists of a long cylinder of carbonic acid gas in liquid state, under a pressure of about 60 lb., and a connected container to hold the extinguishing powder. This is a fine, brownish powder, resembling in appearance and taste, normal carbonate of soda. This powder is expelled by the gas from appliances of all sizes built on the general principle of other makes of extinguishers. Prices for the range of sizes are comparable with those of competing designs, but refills are in each case cheaper than other makes, according to the makers' claim.

At the demonstration tarred barrels, tarred and creosoted timbers were set alight and the fires were extinguished, although supported by generous quantities of petrol. The tests were conclusive and served to demonstrate the undoubted efficiency of the "Total" apparatus in the matter of "first-aid" properties, such as one would expect from reliable extinguishers. A surface of burning petrol was also extinguished in five seconds. It is claimed that the "Total" extinguisher will deal with any type of fire—electrical, chemical, or oil, but these qualities were not demonstrated.

While the extinguishing qualities would not appear to be abnormal, there are several points of distinct advantage in the apparatus. The use of powder instead of corrosive liquids results in increased efficiency because the extinguishers do not deteriorate in storage and need no periodical inspection. It is frequently found that the chemicals corrode the valve, and when the extinguisher is wanted it is found to be useless. Again, no noxious fumes are generated, thus eliminating the necessity for gas masks, and the fine powder applied does not corrode, and is not abrasive, so that it can be applied even to the finest machinery without injury. The "Total" extinguisher is not affected by temperature, and does not freeze, evaporate, or lose its efficiency in any length of service. Models range from hand sizes to large mobile models fitted with hose lengths. The company states that over 800,000 extinguishers have been sold and that chemical works, oil refineries, etc., have adopted their appliances.

Chemist's Invention Claim

THE Inventions Commission, sitting in London on Monday under the chairmanship of Mr. Justice Tomlin, heard the claim of Dr. J. A. Gardner, reader in physiological chemistry to London University, and chemist to St. George's Hospital, in respect to the manufacture of chloropicrin, the material which produced the tear gas used in the war.

Sir James O'Connor, K.C., for the claimant, contended that, as a result of experiments made by Dr. Gardner in 1915 and 1916 at a factory near Wakefield, which had been put at his disposal, the process of making chloropicrin had been reduced from forty-eight hours to three, and there was a great saving in cost. Dr. Gardner made suggestions as to the machinery to be used and also in regard to the apparatus to be used to fill shells with chloropicrin.

Dr. Gardner, in evidence, said that he started experiments with chloropicrin after the Germans had used gas for the first time.

Mr. Trevor Watson, for the Crown, called Sir William Pope, who said that the properties of chloropicrin were well known to organic chemists. Except for one point he did not see anything novel in Dr. Gardner's claim for improving the manufacture of chloropicrin.

The Commission reserved their decision.

Chilean Nitrate Ground Sales

A DECREE has been issued by the Chilean Government dated August 21, 1925, containing amendments to the decree of July 23, which authorised the sale of Government nitrate grounds, as the result of which the President of the Republic may include in the sales to be held on December 11 next any nitrate grounds which he may consider advisable.

Better Use of Coal

Dr. Lessing's Evidence before the Coal Commission

DR. R. LESSING was the principal witness at the further public session of the Coal Commission held on Tuesday in Westminster Hall, London, under the chairmanship of Sir Herbert Samuel. To counter the tendency towards a reduced coal consumption and to allow British coal to compete in the world's markets, Dr. Lessing stated that coal must be produced more cheaply and its value enhanced by refining processes. At present a vast proportion of the coal raised was subjected to practically no preparation, the principal step consisting in the selection exercised by the hewer and loader between coal, smalls and "dirt." By reason of the colliery management insisting on a minimum of shale in the tubs, and the workers endeavouring to escape fines, this system entailed much valuable coal being left underground, and was an exceedingly wasteful one. Moreover, the coal substance thus left in association with the loose "dirt" constituted a source of danger, as it was liable to spontaneous combustion.

Removal of Ash

The most promising line of development in the preparation of coal for the market lay in the extended application of methods for the reduction or practical removal of ash, and in order to effect this, not only must a much larger tonnage of raw coal be passed through washing plants, but the efficiency of the washing process must be considerably increased. Taking the mean percentage of ash in coal put on the market at 10 per cent. and assuming the annual production in Great Britain at 250,000,000 tons, it was estimated that upon burning the coal or coke made from it 25,000,000 tons of incombustible material were obtained. The average length of haul of coal by railway companies was about 43 miles, and with a freight rate of slightly more than 1d. per ton mile this worked out at 3s. 8d. per ton. About £4,500,000 per annum was therefore spent on waste material, while the collection and disposal of the ashes from the place of consumption to their final resting place probably cost more than double this amount. The resulting loss from lowering the combustion and carbonising efficiency might safely be put at the stupendous figure of at least £10,000,000.

A very considerable proportion of the coal raised was in form of slack or duff, which fetched only one-half the sale price of round coal. For argument's sake, round figures of 20s. for round coal and 10s. for slack might be assumed. There were probably 80,000,000 tons of slack produced in Great Britain per annum. It should be possible to refine this slack so as to yield from 55,000,000 to 60,000,000 tons of a material worth at least 20s. per ton, and probably more, at a cost of less than 2s. per ton. This would leave a clear profit of £14,000,000 in the event of the whole output of slack being refined.

Krupp's Steel Plant and Disarmament

THE negotiations of the LocarnoPact having now been successfully concluded, the question of the evacuation of the Ruhr by the Allied troops is once more raised. It will be remembered that the duration of the occupation was to depend on Germany's compliance with the disarmament requirements of the Treaty of Versailles, and that among the plants to be demolished was Krupp's gun-making machinery. The present situation of this giant steel concern at Essen is disclosed by the *Times* correspondent, who states that Krupps's plant for the manufacture of heavy armaments and long-range guns was condemned in 1919, and should have been dismantled immediately. The work of demolition was postponed by Krupps on the ground that the giant lathes and boring machines used in the manufacture of heavy armaments were also utilised for manufacturing high-tensile steel tubes for extracting nitrogen from the air for agricultural purposes. These tubes were being manufactured for the Badische Anilin Co. at Mannheim. Experts, however, claimed that there were other machines in Germany which could manufacture these tubings without also being capable of producing rifles and gun-barrels.

The Disarmament Commission having laid down that the Krupps plant was to be rendered incapable of fulfilling its original functions, the British representative in Essen pressed the firm continually to complete the work of destruction and transformation. Apart from two machines destroyed between 1919 and 1924, no radical alterations or important destructions were effected until the beginning of this year, when it was realised that the British Army would not evacuate till the disarmament obligations were carried out. The original number of machines condemned was 78, of which over one-third were to be destroyed, and of the remainder only 22 were to be maintained in a condition capable of manufacturing armaments.

Chemists and Smoke Abatement

Discussion at S.C.I. Liverpool Section

AT the opening meeting of the session of the Liverpool Section of the Society of Chemical Industry on Friday, October 30, Mr. Edwin Thompson, the retiring chairman, welcomed his successor, Associate-Professor William H. Roberts, Liverpool City Analyst, and thanked the committee and Mr. Gabriel Jones for their assistance during his term of office. The new chairman, in reply, referred to the valuable services of Mr. Thompson in the chair and in other ways.

Smoke Abatement Methods

Professor Roberts, in an address on "Smoke Abatement," said that laws dealing with smoke nuisances could not remedy but could only mitigate the evil. He was not a believer in prosecutions for the emission of excessive smoke, as a remedy, and he was pleased to see that in the new Act the clause was retained which allowed a defendant to plead that he "used the best available means at his disposal" to prevent excessive smoke. As an indication of the magnitudes of the smoke evil, he mentioned that during last year, in one of the thickly populated areas of the city, the rain carried down total solid matters amounting to 615 tons per square mile. Of this quantity some 6½ tons were tarry matter and bitumen; 6½ tons ammonia; 21½ tons calcium salts, sulphuric acid and sulphates, and 21 tons of chlorides. The collected rain water was acid for six months out of the twelve, the acidity being equivalent to 1·9 tons of sulphuric acid per square mile. It was this acidity which did so much damage to the stone and metal work of buildings in the city. The figures gave some indication of the enormous waste of fuel daily proceeding under present conditions. If this country was to continue to progress it was essential that all fuel used must be as cheap as possible. Referring to low-temperature carbonisation of coal, he said that this system was at present in its infancy, and much research work would be necessary before the process could be considered successful. A number of advantages were claimed for this fuel, but the report on Scientific and Industrial Research for 1924 stated, "It is quite certain that no single process has yet become established which would be suitable for application on a national scale." Powdered coal was now being used as a fuel and when used with reasonable care and by mechanical stokers, was practically smokeless. Gas at any price at which it could be commercially supplied to-day was dearer than coal or coke. Electricity, as a method of light, heat, and power production, would eliminate all smoke, but its cost at present was prohibitive. The remedy would seem to be the use of low carbonisation coke, gas, or electricity for domestic purposes. Taking everything into consideration he was inclined to favour the extended use of electricity.

A discussion followed in which Mr. E. T. Williams, Mr. W. A. Damon, Mr. E. Elliott, Colonel E. Briggs, and Mr. R. B. Croad took part.

St. Dunstan's

THE tenth annual report of St. Dunstan's is a tribute to the practical policy of training blind men to be wage-earners. The records are remarkable in that scores of occupations are shown to be followed successfully by St. Dunstan's men. It may not be realised that even now men are going blind as the result of war wounds, and it is to provide these men with every facility for efficient training and to offer lifelong care to all war-blinded men that St. Dunstan's labours. The institution depends entirely upon voluntary support, and donations should be sent to the headquarters, Inner Circle, Regent's Park, London, N.W.1.

From Week to Week

THE GERMAN ARTIFICIAL SILK FACTORIES in Kelsterbach have closed down and staffs have been dismissed.

EXTENSIVE DAMAGE was caused by fire at the Orchard Sugar Refinery, Greenock, on Saturday. The sugar beet factory in course of erection was saved.

THE MANUFACTURE OF FERTILISERS IN CZECHOSLOVAKIA is to be undertaken by the Nobel dynamite works at Presbourg, which have been reorganised.

THE AMERICAN VISITORS in London this week include Mr. T. W. Delahanty, assistant chief of the Chemical Division of the United States Department of Commerce, who is on vacation and is making an unofficial tour of Europe.

INQUIRY at the works of Blackie and Co., manufacturing chemists Tower Bridge Road, London, on Wednesday, showed that the strike reported last week was still in force, but that the company was carrying on business as usual.

FOUR MEN WERE FATALLY gassed while disinfecting the hold of a steamer at Trieste. Cyanogen gas was used under expert supervision and gas masks were used, but the first man to descend succumbed and three men who went to his rescue were fatally gassed.

TWO WORKMEN WERE SEVERELY BURNED at a fire at the works of J. Paxton, Ltd., leather enamellers, of Wimbledon, on Saturday, October 31. The men were filling oil tanks, and were suddenly surrounded by flames thought to have been caused by the ignition of fumes from an empty benzene tank.

A SERIOUS ACCIDENT occurred at the works of J. L. Seaton, Ltd., oil refiners, Hull, on Saturday, October 31. Herbert Crawshaw, 41, chemist, employed at the works, was standing on a ladder to empty a bucket of acid into a tank. The ladder slipped and the acid poured over Crawshaw. He was admitted to the infirmary suffering from serious burns on head and body.

THE OPENING meeting of the session of the Belfast and District Section of the Institute of Chemistry was held last week with Professor Robertson (president) in the chair. There was a discussion on "Chemical Politics: the Relation of Local Sections to Headquarters," and the President handed associate certificates to Mr. H. N. Clear, Belfast, and Mr. John Montgomery, Randalstown.

A. BOAKE, ROBERTS AND CO., LTD., of Stratford, London, inform us that at the Brewers' Exhibition, 1925, in the Aerated Water Section, the award of gold medal was given to a lemonade flavoured with "Trufruit" lemon extract, and the silver medal was awarded to a beverage flavoured with soluble essence lemon "H" brand. At this Exhibition in 1923, the same soluble essences obtained similar awards.

A £10,000,000 GOVERNMENT GUARANTEE for loans raised in connection with East African transport developments was referred to by Mr. L. S. Amery at Bristol on Friday, October 23. A thousand miles of railways was projected, and, apart from the work for iron and steel industries, it was anticipated that the scheme, which is the result of the commission sent out by Mr. J. H. Thomas, will result in considerably increased trade and production.

BIRMINGHAM CORPORATION GAS DEPARTMENT is to provide a bust of Mr. Joseph Chamberlain to mark the jubilee of the purchase of the undertaking by the municipality, for which Mr. Chamberlain was primarily responsible. During the fifty years the undertaking has contributed over £1,600,000 to the relief of the rates. To-day some 400,000 tons of coke, 10,000,000 gallons of tar, and 36,000,000 gallons of ammoniacal liquor are disposed of each year.

ON WEDNESDAY, in London, Sir Thomas Holland delivered his inaugural address to the Royal Society of Arts on the subject of "The Organisation of Scientific Research throughout the Empire." He dealt with the system of concerted action in this country and the linking of these activities with those in the Empire. He referred to the origin, growth and present work of the leading scientific bodies and also of government scientific organisations. Medals awarded during the past session were presented.

IRON CARBONYL, the anti-knock agent which is being developed by the Badische Anilin and Soda Co. for addition to petroleum, is stated to be a heavy brownish fluid, which boils at 103° and is readily soluble in benzene, etc. It decomposes easily in the presence of air and light with the precipitation of brown iron hydroxide, and, according to an American report, it is yet to be determined whether, like other organo-metallic anti-knock compounds, it requires the addition of carbon tetrachloride or the like as a condition of its activity.

AT A MEETING of the Sheffield University Chemical Society on Friday, October 30, a paper was given by Mr. G. B. Stickney and Mr. E. M. Guenault on "British Dyestuffs Manufacture." This was a report on a visit which Mr. Stickney and Mr. Guenauld, with other University students, made to the British Dyestuffs Corporation Works at Manchester, where they had one month's training under working conditions. The following officers were elected for the session: President, Dr. G. N. Bennett; treasurer, Mr. A. G. Hock; secretary, Mr. E. M. Guenault.

AT THE MANCHESTER MUNICIPAL ELECTIONS, Dr. H. Levenstein, Mr. W. Cunliff, and Mr. H. J. Robinson were elected.

RECENT DONATIONS and promises to the funds of the Imperial College of Tropical Agriculture in Trinidad include £100 from the United Alkali Co., Ltd., and £50 from Mr. Francis Ransom, F.C.S.

THE SHEPPEY GLUE AND CHEMICAL CO. have been ordered to pay £299 9s. and £11 1s. 6d. costs in a case brought by the Lower Medway Conservators in connection with the salving of a barge on the Medway.

THE FRENCH GOVERNMENT have conferred on Dr. Charles L. Parsons, secretary of the American Chemical Society, the Cross of the Legion of Honour, Officer Grade, and the honour has been transmitted to him through the French Ambassador at Washington.

SIR JOHN BRUNNER, speaking at Stoke-on-Trent, on Monday, said that the most crying need of the moment was cheaper and quicker transport, and he urged the necessity for a committee of economists to study the matter and to discover whether it would pay to develop railways, roads, or canals.

AT THE WELSH DISASTER on Monday night when the bursting of the Llyn Eigiau dam in the Conway Valley caused extensive destruction, the works of the Aluminium Corporation, Ltd., were flooded and the electric furnaces used in fusing the powdered bauxite exploded, but there was no loss of life among the employees. The Corporation has promised to make good all material loss suffered by the people.

GRIEVE AND GORDON, manufacturers of Australian pure eucalyptus oil and numerous by-products and proprietary lines, will open their first permanent British factory at Eucalyptus Works, 7/11, Burnley Road, Dollis Hill, London, N.10. The firm has done considerable business in this country through its exhibit in the Chemistry Section at Wembley.

DR. H. HIBBERT, whose appointment to McGill University (Chair of Cellulose Chemistry) was reported last week, is a graduate of Victoria University, Manchester. From there he went to Leipzig where he took his Ph.D., and then returned to Manchester to take his D.Sc. He is at present in Europe investigating developments in the pulp and paper and other industries which use cellulose materials.

A GENERAL MEETING of the Royal Institution was held on Monday, when Sir James Crichton-Browne presided. The thanks of members were returned to Professor Frankland for his gift of a number of relics of Faraday, and to Sir Alfred Yarrow for his donation of £248 14s. towards the cost of advertising the lectures. Dr. J. Freeman, Mr. W. S. Jarratt, and Viscount Leverhulme were elected members.

TO MEET CONTINUED EXPANSION the Dorr Co. have formed three self-contained companies to handle European work, with offices as follows: The Dorr Co., Ltd., 16, South Street, London, E.C.; Dorr Gesellschaft, m.b.H., Joachimsthaler Str. 10, Berlin; and Société Dorr and Cie., 126, Rue de Provence, Paris. These three European companies have obtained the manufacturing and selling rights for Dorr equipment, but the American company will still be maintained.

THE WELLCOME CHEMICAL RESEARCH LABORATORIES have just issued several more of their published papers, Nos. 197 to 205, the titles including "The Bactericidal Action of some Organic Compounds of Mercury," "Fermentation of Salts of Organic Acids as an Aid to the Differentiation of Bacterial Types," and "Chenopodium Oil: the Hydrocarbon Fraction." Dr. T. A. Henry is the director of the laboratories, which are at 6, King Street, Snow Hill, London, E.C.1.

A STRIKE AND LOCK-OUT in the chemical industry of Hesse and Nassau began on Saturday, October 31. Six thousand employés of the following firms gave notice overnight of their intention to strike the following morning: Leopold Cassels and Co., Chemische Fabri kGriesheim-Elektron, Ohler (Offenbach), Merck (Darmstadt), Peters Union, A. G. (Frankfort), and Mertz (Mainz). Employers immediately closed their factories, locking out a further 24,000 workers. A strike has been called by the Bavarian celluloid workers in sympathy with chemical workers.

THE GOVERNORS of the Royal Technical College, Glasgow, have awarded the associateship of the college to the following chemical and metallurgical students: Chemistry: J. R. Campbell, B.Sc. (Fairlie), with distinction in physical and inorganic chemistry, and the Sir George Beilby Memorial Medal; M. Herd, B.Sc., A.I.C. (Glasgow); W. Johnston (Kilwinning); A. Y. Livingstone (Falkirk); R. W. Speirs, B.Sc. (Paisley); D. Stenhouse, B.Sc. (Glasgow); H. W. Stephen, B.Sc. (Stirling), with distinction in Physical and Inorganic Chemistry, and the John L. S. Allan Memorial Prize. Metallurgy: H. A. Dickie, B.Sc. (Bearsden).

Obituary

MR. W. S. KINCH, for 25 years director of the Bradford Dyers' Association, and for many years a director of the Clayton Aniline Co., Ltd., at Wigan, aged 88.

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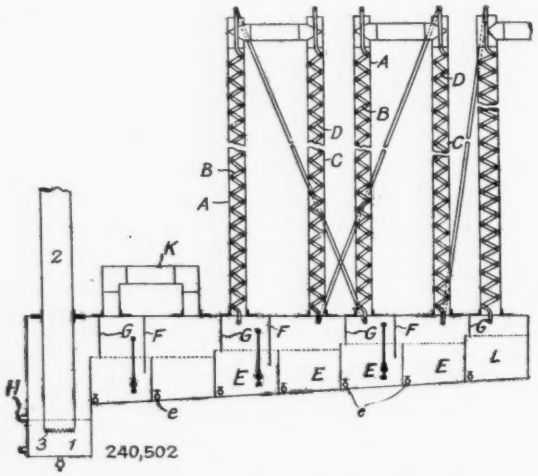
The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

240,502. Fractionation of Hydrocarbon Oils and the Like Liquids. R. H. Crozier, Finsbury Court, Finsbury Pavement, London, E.C. Application date, April 4, 1924.

The vapours from an oil still are passed upwards through columns heated by steam pipes, and then downwards through columns cooled by water pipes. Collecting boxes are provided below the columns. The oil vapour from the still is supplied through a pipe 2 having a serrated outlet 3, to a collecting box 1. The columns A are heated by steam coils B, and the columns C are cooled by water coils D. The condensate passes into collecting compartments E arranged in cascade form. Partitions F are provided, so that the vapour is



compelled to pass through the columns. The partitions F extend downwards far enough to form a liquid seal, and baffles G are provided, the lower edges of which are serrated and terminate just below the liquid level. The vapour passes under the partitions G into the liquid. The by-pass K is provided to connect the first two compartments. This plant may be employed in conjunction with an oil still or retort such as that described in Specification No. 212,770 (see The Chemical Age, Vol. X, p. 416). A series of oil stills each distilling vapour to a fixed boiling point may be connected to condensing sections as described above. Steam may be admitted into any of the collecting boxes to accelerate the vaporisation of lighter fractions.

240,514. Cellulose Esters, Treatment for Dyeing. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, June 2, 1924.

The object is to increase the capacity of cellulose esters, particularly cellulose acetate, for colouring matters without injuring the fibres. The cellulose ester is treated with a bath containing a dissolved ester of a mineral oxygen acid, particularly salts of acid esters of a mineral oxygen acid. Suitable substances are salts of acid esters of sulphuric, phosphoric, or boric acid. In an example, cellulose acetate silk is treated at 50°-60° C. with a 50 per cent. solution of potassium ethyl sulphate with a little acetic acid. The material is then dyed at 40°-70° C. with 1 per cent. of diamond green B in a bath containing a little acetic acid. Other examples are given in which the material is treated with sodium dicresyl phosphate before dyeing with various dyes.

240,589. Iron Oxide Pigments and Polishing Materials, Manufacture of. W. H. Giles, Rangemore Street, Burton-on-Trent, and H. A. Wilson, Church Street, Rugeley, Stafford. Application date, July 29, 1924.

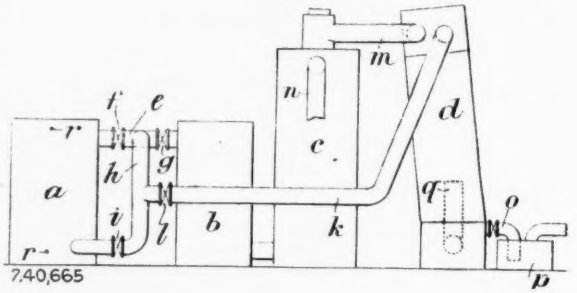
The object is to obtain pigments of oxides or hydroxides of iron in shades ranging from yellow through orange and red to purple. Ferrous sulphate is dissolved in about 1·9 times its weight of water, and soda ash is dissolved in about 4·5 times its weight of water, in both cases preferably at 60°-65° F.

The two solutions are mixed in the proportions required by the reaction equation in a vessel having a mechanical agitator and steam heating pipes. Air is blown in during mixing, and a precipitate ranging from ferrous hydrate to ferric hydrate is obtained, and a solution of sodium sulphate formed. The mixture is filtered and the precipitate washed with hot and cold water under pressure. The liquor may be concentrated to produce sodium sulphate crystals. The iron hydroxide is washed, dried, and calcined at a temperature depending on the shade required. The resulting ferric oxide is ground to obtain a pigment or polishing rouge.

The yellow ferric hydrate is obtained by agitating and oxidising the mixture only to a light yellowish-green colour, and drying the precipitate at a low temperature. An orange ferric hydrate is obtained by agitating and oxidising at a higher temperature, and drying the precipitate at a low temperature.

240,665. Water Gas, Manufacture of. A. G. Glasgow, 38, Victoria Street, Westminster, London. Application date, November 3, 1924.

The plant comprises a generator *a*, carburettor *b*, superheater *c*, and tubular waste heat boiler *d*. A pipe *e* having valves *f*, *g*, connects the generator *a* and carburettor *b*, and a pipe *h* connects the pipe *e* to the bottom of the generator *a* through the valve *i*, and to the top of the boiler *d* by the valve *l* and pipe *k*. The superheater *c* is connected at the bottom to the carburettor *b* and at the top to the boiler *d* by a pipe *m*. Blue water gas may be made on the up run and passed through pipe *k* to the top of the boiler *d* and thence to the holder through the pipe *o* and seal *p*. The down run gas is carburetted and drawn off from the top of the superheater *c*.



Alternatively, blue water gas may be produced from the down run and carburetted gas from the up run, or blue gas may be passed through the carburettor *b* without the addition of oil, and superheater *c*, and then through the boiler *d*. The water gas produced during part of the gas-making time is thus passed through a boiler or other apparatus to absorb the sensible heat of the gas, and is then mixed with water gas produced during another part of the gas-making time. The heat absorber may be a recuperator which gives up its heat to steam or air which are passed to the fuel bed in the water gas generator.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 223,860 (Minerals Separation, Ltd.), relating to con-

centration of ores by froth flotation, see Vol. XI, p. 669; 225,875 (Farbwerke vorm. Meister, Lucius, and Brüning), relating to manufacture of complex gold compounds, see Vol. XII, p. 138; 230,432 (Chemische Fabrik vorm. Sandoz), relating to preparation of ureides of hexahydrogenated aromatic and fatty aromatic carboxylic acids, see Vol. XII, p. 507; 230,774 (O. S. Neill), relating to a heat process of manufacturing ferric oxide, see Vol. XII, p. 508; 231,809 (L. Lilienfeld), relating to manufacture of cellulose derivatives, see Vol. XII, p. 591; 232,599 (Farbwerke vorm. Meister, Lucius, and Brüning), relating to a process for dyeing cellulose esters, see Vol. XII, p. 641; 234,078 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to concentration of dilute nitrous gases, see Vol. XIII, p. 108; 236,152 (Naamlooze Vennootschap Philips' Gloeilampenfabrieken), relating to production of tungsten powder by electrolysis, see Vol. XIII, p. 232.

International Specifications not yet Accepted

238,909. Distilling oils and bituminous materials. H. Hütz, 16, Konradstrasse, Munich, Germany. International Convention date, August 25, 1924.

Bituminous materials such as coal, brown coal, peat, mineral and tar oils, and tar are distilled in the presence of hot neutral gases such as hydrogen, coal gas, or water gas, and also sulphur dioxide.

239,169. Purifying Oils. Akt.-Ges. für Chemiewerte, Mainz, Germany. International Convention date, August 27, 1924.

A purifying substance for vegetable and mineral oils consists of a porous substance such as kieselguhr, carbon, or colloidal silicic acid, made into a pulp with a small quantity of dilute sulphuric acid. The pulp is pressed and dried by heating until sulphurous fumes are evolved.

239,173. Vulcanising Indiarubber. Chemische Fabrik Kalk Ges., and H. Oehme, 1, Kalker Haupt Strasse, Kalk, Cologne, Germany. International Convention date, August 27, 1924.

Indiarubber is vulcanised with sulphur and zinc hydroxide or oxyhydrate.

238,904. Urea-aldehyde condensation products. F. Pollak, 20, Langegasse, Vienna. International Convention date, August 25, 1924.

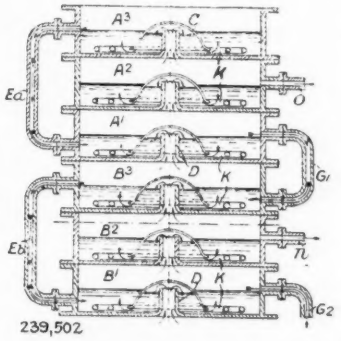
Water in condensation products obtained from urea and formaldehyde is wholly or partly eliminated by adding organic substances such as glacial acetic acid, benzyl alcohol, glycerin, concentrated formic acid, or sugar. These are capable of forming transparent solutions of or in the condensation product, and are not completely distilled off during concentration. Mixtures of the above condensation products with cellulose or its derivatives, plastic substances, camphor, or borneol, may be similarly treated. In an example, a hydrophobe urea-formaldehyde condensation product is dissolved in ethyl alcohol and amyl acetate added. The mixture is concentrated, benzyl alcohol added, and the further concentrated mass hardened to a glassy product. A number of other examples are given.

239,499. Metal and other Carbides. Gewerkschaft Wallram, 85, Heinickestrasse, Essen, Germany. International Convention date, September 8, 1924.

Hard refractory substances are obtained by a single melting of the raw materials in an electric carbon or graphite tube furnace, the mixture being immediately pressed into moulds. Carbides of tungsten, uranium, titanium, molybdenum, chromium and zirconium are obtained by melting the metal or its oxide with carbon, or the product may contain free carbon or free metal. Aluminium, magnesium or sodium may be used as a flux, and also contact substances which may subsequently be evaporated, such as iron, nickel, chromium or vanadium. The raw materials are first pressed into moulds, and when sufficiently soft or molten to enable the mass to be pressed into the mould, steps are taken to prevent excessive absorption of carbon from the mould. In some cases the metal alone may be the starting material owing to this absorption. The raw materials may be moulded in concentric layers of different compositions, the outer layers having less carbon to compensate for absorption of carbon. A suitable electric furnace for carrying out the invention is described.

239,502. Fractional Condensation of Vapours. Soc. Anon. d'Ougrée-Marihaye, Ougrée, Belgium. International Convention date, September 8, 1924.

This apparatus is for the fractional condensation of hydrocarbon vapours obtained in distilling wash oils used for extracting benzol from coke oven gases. The column is divided into sections, each consisting of three plates. The vapours pass upwards through passages D provided with



239,502

bubbling hoods C, and each plate is provided with a cooling coil K, through which cooling medium may be passed in series from the top downwards. Condensate from the upper plates A^3, B^3 of each section passes by pipes E^a, E^b to the lower plates A^1, B^1, and condensate from the lower plates passes by pipes G^1, G^2 to the upper plates of the sections immediately below. Condensate is drawn off only from the middle plates, by pipes *o*, *n*.

239,527. Menthol. G. Austerweil, 113, Boulevard Jean-Jaures, Boulogne-sur-Seine, France. International Convention date, August 21, 1923.

Thymol is hydrogenated at a pressure of 15 atmospheres and temperature of 160°–170° C. with agitation, employing a nickel catalyst. To obtain the catalyst, nickel carbonate is precipitated from nickel sulphate on kieselguhr and reduced with hydrogen at 350°–400° C. The hydrogenated product is washed with caustic alkali to remove thymol, and the crude menthol is oxidised in acetic acid solution with chromic acid, and the menthone reduced in alcoholic solution with sodium. The thymol employed is obtained from cymene as described in Specification 220,953 (see The Chemical Age, Vol. XI, p. 450).

Latest Notifications.

241,851. Apparatus for use in processes wherein hypochlorites are used. Raduner and Co., Akt.-Ges. October 21, 1924.

241,854. Process for rendering immune mercerised cotton, ammonium cuproxide silk, viscose silk, and like products refractory against the further absorption of direct dyes. Chemical works (formerly Sandoz). October 24, 1924.

241,889. Processes of substituting hydroxyl groups for the acid radicals in liquid esters of inorganic acids or for halogens in liquid derivatives of hydrocarbons. Ayres, jun., E. E., and Haabestad, E. H. October 21, 1924.

241,903. Process for the production of phosphoric acid. Chemische Fabrik Griesheim-Elektron. October 23, 1924.

Specifications Accepted with Date of Application

215,334. Viscosity of oils, Process for increasing. E. H. Zollinger. April 30, 1923.

218,638. Synthetic resins, and process of making the same. C. O. Terwilliger. July 5, 1923.

221,227. Thymol from *p*-cymene, Process for the preparation of. G. Austerweil. August 30, 1923.

224,907. Oil and other products from bituminous materials such as shales, schists, coal, or the like. G. Grondal and L. Carlson. November 17, 1923.

231,417. Catalytic synthesis of ammonia. L. Casale. March 29, 1924.

235,125–6–7. Gases or air, Processes and apparatus for the purification of. Koppers Co. June 6, 1924.

236,217. Krypton and xenon from the air, Processes for the extraction of. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. June 24, 1925. Addition to 227,800.

237,575. Acetic anhydride, Method of manufacturing. Ketoid Co., July 22, 1924.

241,248. Elimination of hydrogen sulphide from fuel gases, such as coal gas, water gas, and the like, and from air, Processes and apparatus for. P. C. Rushen. (*Koppers Co.*) June 10, 1924.

241,266. Dimethylxanthines, earth alkali, and salicylic acid, Manufacture of double compounds of. G. M. Clark. (*Knoll and Co., Chemische Fabrik.*) July 14, 1924.

241,270. Dyestuffs, Manufacture of. A. G. Bloxam. (*Akt.-Ges. für Anilin-Fabrikation.*) July 15, 1924.

241,278. Metallic catalysts suitable for use in the manufacture of synthetic ammonia and other purposes, Production of. Technical Research Works, Ltd., and E. J. Lush. July 16, 1924. Addition to 203,218.

241,321. Salt, Manufacture of. J. Sheffield. August 5, 1924.

241,329. White lead, Manufacture of. G. F. Lloyd and F. H. Campbell. August 8, 1924.

241,331. Dyestuff emulsions, Production of. C. E. J. Goedecke and Colloisil Colour Co., Ltd. August 16, 1924.

241,399. Tungsten ore, Process of treating—to obtain tungsten oxide therefrom. K. Anjow. November 13, 1924.

241,413. Nitrogen compounds from the air, Process for the extraction of. C. Spath, sen. December 10, 1924.

241,435. Azo dyes of the pyrazolone series, Manufacture of. Sandoz Chemical Works, and M. Boniger. February 7, 1925.

241,437. Black vat dyestuffs, Manufacture and production of. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) February 12, 1925.

241,452. Spent liquids of liquid gas purification, Processes and apparatus for the treatment of. P. C. Rushen. (*Koppers Co.*) June 10, 1924.

Applications for Patents

Badische Anilin- & Soda-Fabrik. Colouring plastic materials. 26,800. October 26. (Germany, November 3, 1924.)

Badische Anilin- & Soda-Fabrik. Manufacture of vat dyestuffs. 26,801. October 26. (Germany, November 7, 1924.)

Beale, E. S. L., and Dunstan, A. E. Production of aromatic hydrocarbons by cracking. 27,224. October 29.

Blaydon Manure and Alkali Co. (1877), Ltd., and Hill, B. P. Treatment of phosphatic materials. 26,725. October 26.

Blaydon Manure and Alkali Co. (1877), Ltd., and Hill, B. P. Production of barium oxide and/or hydroxide. 27,232. October 30.

British Celanese, Ltd., and Ellis, G. H. Treatment of cellulose derivatives, etc. 27,150. October 29.

British Celanese, Ltd., and Ellis, G. H. Treatment of yarns and fabrics. 27,308. October 30.

Carpmael, W., and Farbenfabriken vorm. F. Bayer & Co. Production of insoluble azo dyestuffs on the fibre. 27,195. October 29.

Casale, L. Catalytic preparation of alcohols, etc. 27,222. October 29.

Cuyck, O. van. Manufacture of colours, etc. 27,173. October 29. (Belgium, May 8.)

Dreyfus, H. Manufacture of cellulose derivatives. 27,309. October 30.

Duncan, W. E. Removal of naphthalene from coal gas. 26,764. October 26.

Fernbach, A., Rowntree and Co., Ltd., and Yuill, J. L. Production of citric acid. 26,786, 26,787. October 26.

Imray, O. Y., and Society of Chemical Industry in Basle. Dyeing acetyl cellulose. 27,083. October 28.

Kowalski, S. W. Prevention of scale in boilers, etc. 26,867. October 27. (Belgium, October 30, 1924.)

Levy, L. A. Manufacture of cellulose acetate. 27,088. October 28.

Soc. Chimique de la Grande Paroisse, Azote et Produits Chimiques. Production of synthetic ammonia. 27,323. October 30. (France, June 2.)

New Australian Glass Industry

As the result of the revised duties the Australian Glass Manufacturers Co., Ltd., is to form a company to manufacture sheet glass. A site at Sydney is under consideration and the factory is to be erected shortly. The company will employ 300 workers and a few skilled operators are to be taken from English works. All materials are available except soda ash, which is manufactured in England. At present Australia is importing annually about 2½ million square feet from the United Kingdom and some 11½ million square feet from Belgium.

A New Use for Carbon Dioxide

Possibilities as Boiler Tube Cleaner

FOLLOWING investigations carried out at the Mellon Institute of Industrial Research, it is possible that a use may be found for carbon dioxide as a boiler tube cleaner. In the preliminary tests fragments of boiler scale were placed in a bottle and covered with water, which was subsequently charged with gas from a carbonating apparatus such as is used in soda fountains, the pressure being 70 lb. per sq. in., and after a few days marked disintegration of the scale was apparent.

Large scale experiments were then made on two horizontal return tubular boilers supplied with feed water which contained about 7 grains of solids per gallon, the solids analysing as follows:—Silicon dioxide, 56·1 per cent.; ferric oxide and alumina, 0·58 per cent.; calcium oxide, 6·98 per cent.; magnesium oxide, 3·98 per cent. The scale had been allowed to accumulate for years, and the ordinary commercial methods of scale removal had very little effect on it.

Two cylinders of carbon dioxide, aggregating 100 lb. net, were charged into the boiler through the circulating pump, the pressure gauge on the boiler then indicating 37 lb. The next day another 50 lb. of gas was added, the gauge then showing 45 lb., the temperature of the water being 84° F. The boiler was allowed to stand for eight days, the pressure finally falling to 30 lb. The boiler was then opened up and the softened scale was knocked off with a high pressure hose. The amount of scale raked out of the boiler was 287 lb. Half the surface of the boiler was entirely free from scale and rust, and the clean surface had the colour of new metal.

The results of these tests show that a solution of carbon dioxide in water is a solvent for boiler scales that are high in silica and lime and low in carbonate. It would, of course, be necessary to carry out a preliminary trial in the laboratory on a sample of scale from the boiler before any attempts were made to apply this method to boilers. It is also essential to have all joints absolutely gas tight to prevent the leakage of carbon dioxide.

As a guide to those who might wish to conduct experiments in this direction, the following typical analyses are given of those scales that reacted favourably with the carbon dioxide method:—

Sample No.	SiO_2%	R_2O_3%	CaO%	MgO%	Water at 230° F. %	Ignition loss %	SiO_3%
1	58·7	1·9	26·1	2·9	3·39	7·07	—
2	56·0	1·9	23·3	3·5	5·02	10·65	—
3	28·14	2·68	36·6	1·9	11·25	0·92	18·10
4	47·94	5·02	29·44	3·1	5·14	8·58	0·45
5	49·56	5·30	27·42	2·66	4·70	9·17	0·91

Nigrosine Merchant's Failure

THE Winding-up Order in the matter of J. Sharp and Co., Ltd., Victoria Works, Springfield Lane, Salford, Manchester, manufacturers and merchants of nigrosine, has been made on a creditor's petition. The statement of affairs showed liabilities of £2,170 2s. 1d., and assets estimated at £1,096 2s. 1d., from which preferential claims of £90 0s. 11d. had to be deducted, leaving £1,006 8s. 2d. to meet the debenture holders' claims of £1,289 6s. 4d. There was a total deficiency as regards contributions of £2,942 2s. 1d. The failure was attributed to bad trade and shortness of capital. The company was incorporated in January, 1924, as a private concern as manufacturers or merchants of nigrosine used in the preparation of black for the boot trade. The company appeared to have been handicapped by the entire absence of working capital and as a result of buying up part of the connection of a smaller firm which went into voluntary liquidation. The Official Receiver considered that further inquiry was necessary.

Argentine Market for Creosote Oil

GREAT BRITAIN has been the chief source of Argentina's imports of creosote oil, furnishing over 70 per cent. of the total in recent years, according to the chemical division of the Department of Commerce. Six to ten per cent. of the imports have been from Germany, with lesser quantities from the United States. Total imports for 1924 were 976,789 kilos, as compared with 636,889 kilos in 1923.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, November 6, 1925.

THE recent improved demand for chemicals has been maintained and business is progressing upon increasingly satisfactory lines.

Prices on the whole continue very steady and there are one or two products which are showing distinct signs of improvement. Some substantial business has been booked for forward delivery.

Export inquiry on the whole is not as satisfactory as it might be, but, on the other hand, in one or two directions the outlook is distinctly healthier than it has been for some little time.

General Chemicals

ACETONE is still firmer and is in extremely short supply. The quotation now is £79 to £81 per ton, and importers are disinclined to book any heavy quantity forward.

ACID ACETIC continues in steady demand and the price is unchanged at £37 to £38 per ton for technical 80%, and pure at £38 to £40 per ton.

ACID FORMIC is very steady and in good request at £47 per ton for 85%.

ACID LACTIC is a firm spot although the price is nominally unchanged at £43 per ton to £44 per ton for 50% by weight. An advance is not unlikely.

ACID OXALIC has advanced as foreshadowed in our report of last week. The quotation is now 3⅝d. to 3¾d. per lb., and a further advance is not unlikely.

ALUMINA SULPHATE.—A good business is reported, and price is very steady at round about £5 10s. per ton for 17/18%.

AMMONIUM CHLORIDE continues slow and is offered at from £24 to £25 per ton in casks.

ARSENIC still lifeless and in buyer's favour. The average value is from about £15 to £16 per ton. There is a feeling, however, that this is about the lowest point the market is likely to reach.

BARIUM CHLORIDE has maintained its advance and is steady at £8 10s. to £8 15s. per ton.

BLEACHING POWDER.—Unchanged.

EPSOM SALTS are very firm at £5 10s. per ton.

FOLMALDEHYDE continues scarce and is quoted at from £43 10s. to £44 10s. per ton, with a firmer tendency.

LEAD ACETATE maintains its advance. White is £46 and brown £45 per ton, with the latter extremely scarce.

LIME ACETATE firm, with quotation at £15 per ton, basis 80%.

LITHOPONE.—In moderate demand and unchanged at £15 to £20 per ton.

POTASSIUM CARBONATE is inclined to be easier, and is quoted at £24 per ton for 90/92%. Other strengths pro rata.

POTASSIUM CAUSTIC.—Unchanged.

POTASSIUM CHLORATE is perhaps not quite so firm, but is unchanged at from 4d. to 4¼d. per lb.

POTASSIUM PERMANGANATE is slightly more active, but still inclined to be weak at 7½d. per lb. for B.P.

SODIUM ACETATE continues quiet and is quoted at £17 10s. per ton.

SODIUM BICHROMATE.—Active business continues to be reported at the new figure.

SODIUM HYPOSULPHITE is very quiet and price is unchanged.

SODIUM NITRITE is only in small demand and is quoted at £22 10s. per ton.

SODIUM PRUSSIATE is more active and is offered at 4½d. to 4⅝d. per lb.

SODIUM SULPHIDE continues weak and under the influence of foreign competition. Price is unchanged.

ZINC SULPHATE has been a better market and is quoted at £14 per ton.

Coal Tar Products

The market in coal tar products remains firm, and supplies of most commodities are somewhat restricted.

90% BENZOL is steady at 1s. 8d. per gallon on rails.

PURE BENZOL remains unchanged at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL is firm at 6¼d. per gallon on rails in the north, while in London the price is about 7½d. per gallon.

CRESYLIC ACID has a slightly improved demand, the pale quality 97/99% being quoted at about 1s. 7d. to 1s. 8d. per gallon on rails, while the dark quality 95/97% is worth about 1s. 3d. to 1s. 4d. per gallon.

SOLVENT NAPHTHA is firm at 1s. 4d. per gallon on rails.

HEAVY NAPHTHA is unchanged at 1s. 1d. per gallon.

NAPHTHALENES are firm, although prices remain somewhat low, the lower grades being worth from £4 to £4 10s. per ton, 76/78 quality about £6 per ton, and 74/76 quality about £5 10s. per ton.

PITCH is firm at 42s. 6d. per ton f.o.b. U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL in steady request at 10s. to 15s. decline. Spot, £38 15s.; Nov. and Dec., £37 10s.; Jan.-April, £37 5s.; May-Aug., £36 12s. 6d. RAPE OIL quiet. Crude, crushed, spot, £47 10s.; technical, refined, £50 10s. COTTON OIL slow. Refined common edible, £45; Egyptian, crude, £39; deodorised, £47. TURPENTINE firm. American, spot, 77s. 3d.; Dec., 77s. 9d.; and Jan.-April, 79s. 6d. per cwt.

HULL.—LINSEED OIL naked, spot, £38; Nov.-Dec., £37 15s.; Jan.-April, £37 12s. 6d.; May-Aug., £37 2s. 6d. COTTON OIL.—Naked, Bombay crude, £35 10s.; Egyptian crude, £36 10s.; edible refined, £40; deodorised, £38 10s. PALM KERNEL OIL. — Crushed, naked, 5½ per cent., £41 10s. GROUND NUT OIL.—Crushed-extracted, £46; deodorised, £50. SOYA OIL.—Extracted and crushed, £40; deodorised, £43 10s. RAPE OIL.—Extracted and crushed, £46 per ton net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products Market

Export.—During the last week the demand for sulphate of ammonia has been quieter and prices have remained unchanged at £12 5s. per ton, f.o.b. U.K. port. There have been further inquiries for considerable quantities from the Far East, but up to the present no business has matured. It appears that a considerable demand will set in shortly and that prices will be steadily raised from now to April.

Home.—There is no life in the home market, the autumn demand being smaller than usual. This is no doubt due to the larger purchases during the summer and the consumption of stocks. Home prices for November are £12 11s. per ton for neutral quality basis 21·1 per cent. nitrogen delivered in 4-ton lots to consumer's nearest station.

Nitrate of Soda.—The nitrate market continues quiet, cargoes c.i.f. chief European ports are fetching £11 8s. per ton for prompt arrival; higher prices are being charged for later arrivals.

American Market Movements

(From *Drug and Chemical Markets.*)

AQUA ammonia prices lower. Sodium fluoride firmer. Prussiates steady. Heavy acids strong. Consuming demand for heavy chemicals is good, but market is devoid of trading activities. Benzene remains easy, but prices are firm. Solvent naphtha and xylenes very scarce. Toluene tighter. Pyridine shaded. Cresylic acid weak. Intermediates very steady and prices are unchanged on entire list.

Fine chemicals have shown some recovery, but prices generally are unchanged. Quicksilver shows a firmer tone with prices advancing.

German Dyes for Russia

IT is reported that the Russian Foreign Trade Commissariat has given an order to German firms for dyes of the value of 25,000,000 marks.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d; Contract, £8 10s. d/d, 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3⅞d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 30s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4¾d. per lb. Crude 60's, 1s. 3d. to 1s. 4d. Very poor demand.
Acid Cresylic 97/99.—1s. 6d. to 1s. 7d. per gall. Pale, 95%, 1s. 6d. per gall. Dark, 1s. 6d. per gall. Good demand.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—10d. per gall. Good inquiry. Unstrained, 7d. to 7½d. per gall.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 11d. to 2s. 3d. per gall., ex works in tank wagons. Firm.
Toluol.—90%, 1s. 9d. per gall. More inquiry. Pure, 1s. 11d. to 2s. 2d. per gall.
Xylol Commercial.—1s. 11d. to 2s. 3d. per gall. Pure, 2s. 3d. to 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8d. per gall. Market very quiet. Standard specification, 7d. per gall.; middle oil, heavy, 6d. per gall. Market steady.
Naphtha.—Crude 9½d. per gall. Solvent 90/160, 1s. 6½d. to 1s. 10d. per gall. Fair business. Solvent 90/190, 1s. 0½d. to 1s. 6d. per gall. Moderate demand.
Naphthalene Crude.—Drained Creosote Salts, £3 15s. to £5 per ton. Whizzed or hot pressed, £4 10s. to £5. Better inquiry.
Naphthalene.—Crystals and Flaked, £12 to £13 per ton, according to districts.
Pitch.—Medium soft, 36s. to 47s. 6d. per ton, according to district. Moderate demand.
Pyridine.—90/160, 18s. 6d. to 19s. per gall. Fair demand. Heavy, 10s. 6d. per gall. More inquiry.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Amidonaphthol disulpho (1-8-2-4).—10s. 9d. per lb.
Acid Anthranilic.—7s. per lb. 100%.
Acid Benzoic.—1s. 9d. per lb.
Acid Gamma.—9s. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 9d. per lb. 100% basis d/d.
Acid Sulphanilic.—8½d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. to 7½d. per lb. naked at works.
Aniline Salts.—7d. to 8d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzaldehyde.—2s. 1½d. per lb. Good home inquiry.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 10d. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.
B-Naphthol.—1s. per lb. d/d. Fair home inquiry.
a-Naphthylamine.—1s. 3d. per lb. d/d. Fair home inquiry.
B-Naphthylamine.—3s. 9d. per lb. d/d. Fair home inquiry.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d. Fair home inquiry.
Nitrobenzene.—5d. to 5¼d. per lb. naked at works. Good home inquiry.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronaphthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—1s. 7½d. to 1s. 8d. per lb. 100% basis d/d.
o-Toluidine.—9d. per lb. Good home inquiry.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.
m-Xylidine acetate, 2s. 11d. per lb. 100%.

Wood Distillation Products

Acetate of Lime.—Brown £8. Quiet market. Grey, £14 10s. per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 to £9 per ton, according to grade and locality. Demand fair.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.
Red Liquor.—10d. to 1s. per gall. 15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P. Very quiet.
Wood Tar.—£3 15s. to £5 per ton, according to grade.
Brown Sugar of Lead.—£40 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5½d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5½d. to 6½d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 6½d. to 2s. 8d. per lb. Keen competition continuing. Good demand.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4d. per lb., less 5%. Unsettled.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 6d. per lb. Resublimed 9s.
Acid, Salicylic.—1s. 4d. to 1s. 6d. per lb. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 10d. per lb.
Acid, Tartaric.—1s. 0½d. per lb., less 5%. Market firm.
Amidol.—6s. 6d. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—12s. 9d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb.
Benzonaphthol.—3s. 3d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb. according to quantity.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 10d. to 2s. per lb.; sodium, 2s. 1d. to 2s. 3d. per lb.; ammonium, 2s. 5d. to 2s. 7d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 3½d. to 1s. 6½d. B.P. 2s. 8d. to 3s., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. per lb.
Formaldehyde.—£41 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. to 7s. per lb.
Hexamine.—2s. 5d. per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4½d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 10d. to 2s. 1d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 9d. to 2s. per lb. Prices advanced.
Magnesium Carbonate.—Light Commercial, £33 per ton net.
Magnesium Oxide.—Light Commercial, £70 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. net per lb., October delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make. Very heavy demand.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. 2d. per lb. Market firmer.
Methyl Salicylate.—1s. 8d. per lb. Demand increasing, price firmer.
Methyl Sulphonal.—16s. 9d. per lb.
Metol.—9s. per lb. British make.
Paraformaldehyde.—1s. 9d. for B.P. quality.
Paraldehyde.—1s. 4½d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.
Potassium Citrate.—1s. 9d. to 2s. per lb. Advanced.
Potassium Ferricyanide.—1s. 8d. to 1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot. Slightly easier.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—51s. 5d. to 53s. 8d. per lb., according to quantity. Fair demand.
Salol.—3s. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 6d. to 1s. 9d. per lb., B.P.C., 1923. 1s. 9d. to 2s. per lb., according to quantity. Advanced.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. to 80s. per cwt., according to quantity.
Sodium Salicylate.—Powder, 2s. to 2s. 1d. per lb. Crystal, 2s. 2d. to 2s. 3d. per lb. Flake, 2s. 2d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. per lb. Limited demand.
Thymol.—13s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—11s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—6s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural.—16s. 9d. per lb.
Coumarin.—12s. 6d. per lb.
Citronellol.—16s. per lb.
Citral.—9s. 6d. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—23s. 6d. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—18s. per lb.
Linalyl Acetate.—18s. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ketone.—40s. 6d. per lb.
Musk Xylol.—5s. 9d. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—11s. 6d. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 4d. per lb.
Terpineol.—1s. 8d. per lb.
Vanillin.—21s. 6d. to 23s. 6d. per lb. Good demand.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 9d. per lb.
Bergamot Oil.—26s. per lb.
Bourbon Geranium Oil.—15s. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—10s. 6d. per lb.
Citronella Oil.—Java, 85/90%, 3s. 5d.; Ceylon, 2s. 4d. per lb.
Clove Oil.—7s. 3d. per lb.
Eucalyptus Oil, 70/75%.—1s. 10d. per lb.
Lavender Oil.—French 38/40% Esters, 28s. per lb.
Lemon Oil.—6s. 9d. per lb.
Lemongrass Oil.—4s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 6d. per lb.
Peppermint Oil.—Wayne County. 80s. for shipment from U.S.A. Japanese, 28s. 9d. per lb. Market excited.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, November 6, 1925.

THE heavy chemical market has been fairly active during the past week, a good volume of business being placed both for home and export. Prices are on about the same level as last reported, with the exception of formaldehyde which is firmer, and arsenic which shows a further decline.

Industrial Chemicals

ACID ACETIC.—In usual steady demand, 98/100% quoted £55 to £67 per ton according to quality and packing, c.i.f. U.K. ports. 80% pure, £40-£42 per ton; 80% technical, £38 to £40 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton. Powdered, £42 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Demand rather slow and prices easier at about 4¼d. per lb., delivered f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at about 1s. 3¾d. per lb., less 5% ex store.

ACID FORMIC, 85%.—Quoted £46 per ton, ex wharf. Prompt shipment from the continent.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80%.—Remains unchanged £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Offered for prompt shipment from the continent at about 3¾d. per lb., ex wharf. Shot material quoted 3½d. to 3¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Steady demand and price unchanged at about 11½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Rather higher quotations from the continent. Now quoted £8 per ton, c.i.f. U.K. ports. Spot material available at about £9 5s. per ton, ex store. Powdered quality quoted £7 15s. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—In moderate demand and price unchanged at 1s. 4½d. per lb., less 5%, ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton. Packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID, 880°.—In usual steady demand and price unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvaniser's crystals now quoted £27 10s. per ton, ex station. Offered from the continent at about £23 5s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 5s. per ton, c.i.f. U.K. ports.

ARSENIC, REFINED WHITE CORNISH.—Now on offer at about £18 10s. per ton, ex wharf, early delivery. Spot material quoted £21 per ton, ex store.

BARIUM CHLORIDE.—Large white crystals quoted £9 per ton, ex store. Spot delivery on offer from the continent at about £7 15s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £7 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—English material quoted £9 10s. per ton, ex station, contracts 20s. per ton less. Offered from the continent at £8 2s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton. Crystals, £25 per ton. Powdered, £26 per ton, carriage paid, U.K. stations.

CALCIUM.—English manufacturer's price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental unchanged at about £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—In good demand for export. Price unchanged at about £3 7s. 6d. per ton. f.o.b. U.K. ports, packed in casks.

COPPER SULPHATE.—English material for export now quoted £23 10s., f.o.b. U.K. ports. Continental on offer at about £23 per ton, ex wharf.

FORMALDEHYDE, 40%.—Spot material on offer at £41 10s. per ton, ex store. Offered for prompt shipment from the continent at about £41 per ton, c.i.f. U.K. ports.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material on offer at £44 per ton, ex store.

LEAD, WHITE.—Quoted £44 10s. per ton, ex store, spot delivery. On offer from the continent at about £43 per ton, ex wharf.

LEAD ACETATE.—White crystals offered from the continent at £44 per ton c.i.f. U.K. ports. Quoted £45 per ton, ex store, spot delivery.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Syndicate prices unchanged at £27 10s. per ton, c.i.f. U.K. ports. Spot material available at about £29 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

POTASSIUM CARBONATE 96/98%. On offer from the continent at about £25 15s. per ton, c.i.f. U.K. ports. Spot material available at £26 10s. per ton, ex store.

POTASSIUM CHLORATE 98/100%.—Offered from the continent at £30 per ton, c.i.f. U.K. port for powdered, £32 10s. crystals. Only small quantities available for near delivery.

POTASSIUM NITRATE, SALTPETRE.—99% refined granulated quoted £24 15s. per ton, c.i.f. U.K. ports. Spot material available at about £27 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot materials quoted 8d. per lb., ex store. Offered for early delivery at 7¾d. lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Still further advanced. Now quoted 7½d. per lb., ex store. Offered prompt shipment from the continent at a fraction less, ex wharf.

SODA CAUSTIC.—76/77%, £17 10s. per ton.; 70/72%, £16 2s. 6d. per ton. Broken 60%, £16 12s. 6d. per ton. Powdered, 98/99%, £20 17s. 6d. per ton. All carriage paid, U.K. stations, spot delivery. Contracts £20s. per ton less.

SODIUM ACETATE.—Spot material now quoted £18 10s. per ton, ex store. Offered from the continent at about £17 15s. per ton, c.i.f. U.K. Ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture unchanged at £9 10s. per ton, ex station, minimum ton lots. Pea crystals, £14 per ton, ex station. Continental commercial quality quoted £9 5s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98% refined quality 7s. 6d. per ton, extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the continent about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Still in good demand and price for spot material, now about 4½d. per lb., ex store. On offer from the continent at 4½d. per lb., ex wharf.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid 60/62%. Now £13 per ton. Broken, £14 per ton. Flake, £15 per ton. Crystals, £8 10s. per ton. Carriage paid U.K. stations, minimum four-ton lots with slight reductions for contracts to the end of the year. 60/62% solid offered from the continent at £10 15s. per ton, c.i.f. U.K. ports. Broken £1 per ton more. 30/32% crystals £7 15s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s., rock, £9 7s. 6d.; ground, £9 5s. per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE 98/100%.—Quoted £23 per ton, c.i.f. U.K. port, prompt shipment from the continent. English material 96/98% quoted £23 15s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Of continental manufacture on offer at about £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

GAMMA ACID.—7s. 3d. per lb. Fair home inquiries.

BETA NAPHTHOL.—11d. to 1s. per lb. Some home inquiries.

H. ACID.—3s. 6d. per lb. Some home inquiries.

BENZALDEHYDE.—2s. 1d. to 2s. 2d. per lb. Fair home inquiries.

U.S. Methanol Imports Increasing

DURING August 48,410 gallons of methanol, valued at $21,493, were imported into the United States. During July, 7,847 gallons, valued at $3,865, were imported. In 1924 only 48 gallons, valued at $29, were imported. During the first quarter of this year 122,906 gallons, valued at $56,422, were imported, and during the second quarter 185,178 gallons, valued at $84,622.

The Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, November 6, 1925.

The demand for chemicals on the Manchester market this week has been of a quietly steady character and the improved tone referred to in my last report seems to continue. Most lines of heavy chemicals are pretty well maintained in value, although here and there a slight sagging is noticeable. In few instances, however, is the weakness very pronounced. Buying for home consumption is at about the same level as last week, with export business comparatively quiet and confined chiefly to the Dominions and the East.

Heavy Chemicals

A fair demand for soda crystals is being met with and prices are steady at about £5 5s. per ton. Prussiate of soda is in moderate request and values are firm at round 4d. per lb. Sulphide of sodium is about on the same price level as last week, 60-65 per cent. concentrated solid being quoted at £11 15s. per ton and commercial quality at about £9 10s.; demand for this material is not too brisk. Saltcake is only in limited inquiry at round £3 12s. 6d. per ton. Glauber salts are maintained at about £3 10s. per ton, though not much business is being put through. Acetate of soda attracts only a limited amount of attention at £17 10s. per ton. Chlorate of soda is rather quiet but value is unchanged at about 2¾d. per lb. Hyposulphite of soda is on offer at from £14 10s. to £15 per ton for photographic crystals and £9 10s. for commercial quality, with business within rather narrow limits. Caustic soda is selling pretty freely with spot quotations unchanged at from £15 12s. 6d. per ton for 60 per cent. material to £18 for 76-77 per cent. strength. Alkali meets with a fairly good demand both for home trade and for shipment and prices are steady at £6 15s. per ton. Bleaching powder is in quiet request at £9 to £9 10s. per ton. Bicarbonate of soda attracts a fair amount of buying interest and quotations are unchanged at £10 10s. per ton. Bichromate of soda is steady though rather quiet at 4d. per lb. Phosphate of soda is on offer at £12 5s. per ton, but sales are comparatively slow.

Carbonate of potash meets with a quietly steady inquiry and prices are firm at £25 to £26 per ton. Caustic potash is on offer at £28 10s. to £29 per ton for 90 per cent. material, a moderate amount of business being done. Permanganate of potash is rather slow and values have an easy tendency; pharmaceutical quality is quoted at 7½d. to 7¾d. per lb. and commercial at about 5¾d. Bichromate of potash is on offer at about 5d. per lb., but inquiry is not particularly active. Chlorate of potash is steady and in fair request at about 4d. per lb. Yellow prussiate of potash is in quiet demand and is still quoted at about 7¼d. per lb.

Little improvement in the position of arsenic can be reported this week, and demand keeps slow with consequent weak quotations; white powdered, Cornish makes, is no better than £16 to £16 10s. per ton on rails. Sulphate of copper is maintained at £24 to £24 10s. per ton, and a fair volume of inquiry is coming through. Nitrate of lead is steady though rather inactive at £41 to £42 per ton. There has been little change in the price of acetate of lead which is offering at £44 to £45 for white and £39 to £40 per ton for brown. Acetate of lime is quiet at £14 10s. to £15 per ton for grey and round £7 10s. for brown material. Sales of Epsom salts are restricted though values are fairly steady at about £3 15s. per ton. Magnesium sulphate, B.P. quality, is on offer at £5 5s.

Acid and Tar Products

Oxalic acid is still quoted at about 3⅞d. per lb., but demand is slow. Citric acid is quiet at round 1s. 3¾d. per lb. Tartaric acid is also only in moderate request at about 11½d. per lb. Acetic acid is selling in fair quantities at about £38 per ton for 80 per cent. commercial material and £66 to £67 for glacial.

Among coal-tar products pitch meets with rather poor demand and values are nominal at round 40s. per ton. Carbolic acid is attracting very little attention and prices are weak at 4¼d. per lb. for crystals and 1s. 3d. to 1s. 4d. per gallon for crude. Solvent naphtha is quiet, but about unchanged from last week at 1s. 5½d. to 1s. 6d. per gal. Creosote oil meets with a moderate demand at round 6d. per gal.

Company News

North Broken Hill.—Dividend (No. 64) of 2s. and a bonus of 4s. have been declared payable on December 7.

"Sanitas" Co.—An interim dividend at the rate of 9 per cent. per annum on the preference shares has been declared, payable on December 1.

A. and F. Pears.—The profit for the year to June 30 last was £83,739, making with £13,767 brought forward, £97,506. A dividend of 20 per cent. is proposed, carrying forward £7,106.

Langdales Chemical Manure Co.—The profit for the year to September 30 last was £2,149, plus £211 brought in. A dividend of 2½ per cent., less tax, is proposed, carrying forward £214.

Zinc Corporation.—The directors have declared the balance dividend of 2s. per share on the preference shares, also an interim participating dividend of 3s. on both the preference and the ordinary shares.

Broken Hill South, Ltd.—For the year ended June 30 last a net profit of £473,357 was secured, against £458,378 for the preceding year; to which are added £246,055 brought forward and £65,474, the unexpended balance of last year's provision for plant and development. The total distribution for the year of 50 per cent., against 20 per cent. for the previous year, absorbs £400,000; £13,333 is required for the debenture sinking fund instalment, and £80,000 is again set aside for plant and development account, leaving a balance of £291,554 to be carried forward.

Tariff Changes

Australia.—Dumping duties are imposed on carbide of calcium originated in or exported from any country of less f.o.b. value than £14 1s. per ton, and on carbide of calcium originated in or exported from any country on which the sea freight charges are less than £5 per ton, provided that dumping duty shall not be charged in the latter case if the c.i.f. price is £18 10s. 1d. per ton or over.

Federated Malay States.—The manufacture of morphine or cocaine or any salts thereof is prohibited.

Irish Free State.—The Beet Sugar (Subsidy) Act, 1925, authorises the payment of subsidies for sugar manufactured during the period of ten years from October 1, 1925, from home-grown beet.

Germany.—An import duty of 1 Rm. per 100 kilogs of ferromanganese with a manganese content of over 50 per cent. is now imposed.

Spain.—The following are revised duties applicable to U.K. goods: Trichlorethylene and tetrachlorethylene, and derivates of ethylene used as solvents, 10 pesetas per 100 kilogs.

Greece.—Proposed changes in the import tariff include the following:—

Articles.	"Minimum" Tariff Duty. Present. Dr. (gold) per 100 kilogs.	Proposed. Dr. (gold) per 100 kilogs.
Superphosphates	2	1
Other chemical fertilisers	2	0·50
Sulphate of potash and chloride of potassium	1	Free
Inks for writing or drawing	30	40
Thick inks	20	Unchanged
Quinine, cinchonine, quinidine and their salts	100	50
Hydraulic lime, cement, and puzzolana	5	Unchanged
Petroleum for lighting:		
Imported in bulk	23·50	55
Imported in cans and cases	21	49
Naphtha (Mazout, Diesel oil) and residues thereof, unfit for lighting or lubricating purposes	5	1
Petrol	10	12
Sulphate of ammonia	1	Free
Nitrate of soda	1	Free
Chloride of lime, also hypochlorite of potash or soda	2	Unchanged
Sulphide of carbon and tetrachloride of carbon	5	1

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

HUTCHINSON, L. and E., 22, Chancery Lane, Bolton, chemical merchants. (C.C., 7/11/25.) £19 0s. 8d., September 16.

Deed of Arrangement

[*NOTE.—The following deed of arrangement with creditors has been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.*]

WAINWRIGHT, Charles Stanley, and DOUGLASS, Albert Basil, trading at Trent Lily Works, Long Eaton, as WAINWRIGHT AND DOUGLASS, soap manufacturers. (D.A., 7/11/25.) Filed October 31. Trustee, S. Blythen, Victoria Chambers, Long Eaton, C.A. Secured creditors, £100; liabilities unsecured, £627; assets, less secured claims, £517.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

ELDERS WALKER AND CO., LTD., Gateshead, paint manufacturers. (M., 7/11/25.) Registered October 20, further charge for £740 inclusive of £80 outstanding on mortgage dated May 16, 1914, to Building Society; charged on 314 and 346, High Street, Gateshead. *£533 9s. 3d. May 4, 1925.

SQUIRE (J. H.), LTD., Manchester, manufacturing chemists and wine merchants. (M., 7/11/25.) Registered October 19, £1,000 mortgage, to Building Society; charged on properties at Cheadle, etc. *Nil. June 25, 1925.

STOCKTON-ON-TEES CHEMICAL WORKS, LTD. (M., 7/11/25.) Registered October 23, £46,000 debentures; general charge. *Nil. August 11, 1925.

TAYLORS' DRUG CO., LTD., Leeds. (M., 7/11/25.) Registered October 21, £1,400 mortgage to Mrs. A. R. Crowther, 6, Street Lane, Roundhay, and another; charged on 264, Dewsbury Road, Hunslet. *£111,744 0s. 11d. September 12, 1924.

WILLIAMS (HOUNSLOW), LTD., chemical manufacturers. (M., 7/11/25.) Registered October 20, £1,000 (free of income tax) annuity bond, to Mrs. M. Williams, 11, Porchester Terrace, Bayswater; general charge; also registered October 20, £20,000 debentures; general charge (subject to above).

Satisfaction

SMITHS (HAMPTON), LTD., London, E.C., soap manufacturers. (M.S., 7/11/25.) Satisfaction registered October 26, £10,000, registered July 6, 1921; and £9,000 (collateral), registered November 7, 1923.

Receivership

PHARMACOPEIAN FORMULÆ, LTD. (R., 7/11/25.) E. J. P. Barlow, of 88, Selwyn Avenue, Richmond, was appointed receiver and manager on October 2, under powers contained in debenture dated May 5, 1925.

London Gazette, &c.

Company Winding Up

HADFIELD'S CHEMICAL WORKS, LTD. Meetings of creditors November 11, 11.30 a.m., and contributories, November 11, 12 noon, 33, Carey Street, Lincoln's Inn, London, W.C.2.

Companies Winding Up Voluntarily

CARLTON BLEACHING AND DYEING CO. (1923), LTD. (C.W.U.V., 7/11/25.) By special resolution September 30, confirmed October 21; Christopher Thompson, Chartered Accountant, Armitage Chambers, Victoria Street, Nottingham, appointed liquidator.

MARSO, LTD. (C.W.U.V., 7/11/25.) R. E. Chadwick, 13, South Street, Pendleton, appointed liquidator, October 23. Meeting of creditors at 70, Major Street, Manchester, Saturday, November 7, 12 noon; creditors' claims by November 13.

Partnership Dissolved

NORMAN, SMEE AND DODWELL (Wilfred Syms DODWELL, Reginald Power DODWELL, Herbert SMEE and Harold Marsden COLDREY), varnish makers, Miles Lane, Mitcham, Surrey, by mutual consent as from March 31, 1925. Debts received and paid by R. P. Dodwell, H. Smee and H. M. Coldrey.

New Companies Registered

COLE AND CO. (WIMBLEDON), LTD. Chemists, druggists, chemical manufacturers and dealers, drysalters, etc. Nominal capital, £1,000 in £1 shares. Solicitor: F. W. Wareham, 14, John Street, Adelphi, London.

LOMAGUNDI (RHODESIA) CHROME MINES, LTD., 86, St. Vincent Street, Glasgow. To acquire land containing chrome ore and other metals and minerals, etc. Nominal capital, £40,000 in £1 shares.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CREOSOTE.—The Administration of the South African Railways and Harbours invite tenders by December 3, for the supply of 50,000 gallons of creosote of British origin. (Reference No. B.X. 2121.)

PARAFFIN WAX.—British manufacturer's agent wishes to represent exporting firms in Colombia. (Reference No. 484.)

DRUG SUNDRIES.—Manufacturers' agents in Toronto wish to represent British manufacturers for the whole of Canada and Newfoundland. (Reference No. 444.) A Wellington, N.Z., agent desires representation for above. (Reference No. 446.)

FIRE EXTINGUISHERS.—An Amsterdam agent desires to represent British manufacturers. (Reference No. 468.)

PAINTS, ETC.—A Tokio surveyor desires catalogues of paints, glass, etc., and adhesive substances. (Reference No. 481.)

U.S. Sulphuric Acid Production

U.S. FERTILISER manufacturers during the first half of 1925 produced 855,338 tons of sulphuric acid and consumed 971,984 tons in the manufacture of 1,800,226 tons of acid phosphates containing 30,142,960 units (of 20 lb.) of available phosphoric acid, according to the U.S. Department of Commerce. The production of sulphuric acid by fertiliser manufacturers was thus equal to 88 per cent. of their total consumption. Acid phosphates sold as such amounted to 1,352,868 tons, containing 22,263,105 units of available phosphoric acid; and 1,203,272 tons, containing 19,414,885 units, were consumed in the manufacture of other fertilisers.